The IRON AGE

Vol. 160, No. 12 — September 18, 1947

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The New Frontier

FOR more than two years the country's several uranium (chain reaction) piles have been glowing with a malignant fury. Steadily they have turned out the raw material for THE BOMB, but also they give promise of an enormous storehouse of future sub-atomic power, and have already produced large quantities of radio-isotopes of most elements.

To a civilization brooding on their horrific capacity for destruction and resentful of a precarious balance near the edge of nothingness, the unlimited power of the future and the radio-isotopes of the present pale in importance. Even the scientists turn a somewhat beady eye on the demon they invoked but cannot exercise. But scientists are a peculiar breed of men, ever fascinated by uncharted seas of adventure, and their imaginations are beginning to fire with the possibilities of radio-isotopes in the determination of a library full of new information on metallic structures and metallurgical behavior.

Isotope is merely a fancy name for one of several varieties of a particular element (sulphur, for instance), which are chemically indistinguishable. They are very common in nature and can only be detected one from another by a physicist with elaborate equipment for determining differences in atomic mass. In 1934, the Curie-Joliots artificially made the first unstable or radioactive isotopes. The operating uranium pile is now the prolific source of large quantities of such homologues, none of which are found in nature. These artificial isotopes are chemically identical with those found in nature, the significant difference being that they give off powerful radiations. This radioactivity is independent of all physical and chemical conditions. The lowest or the highest temperatures do not affect it in the least.

Here then, the experimenter has a tool with four phenomenal properties. First, the radioactivity is indestructible. Second, the radioactivity can be detected in quantities so minute as to stagger credulity. For instance, the smallest speck of matter which the analyst can detect on his most sensitive balance will contain something like a million million atoms. But by using radioistopes and specially devised electrical detecting equipment, he is easily able to deal with a hundred-millionth of this: or, more specifically, it is possible to detect 0.000,000,000,000,001 oz of radioactive phosphorus. Third, the radioactivity is detectible at a distance. Consequently, purification or isolation of samples is not necessary as it often is in direct chemical analysis. Fourth, each radioisotope has its own peculiar radiation, which is detectible by means of radiospectroscopy.

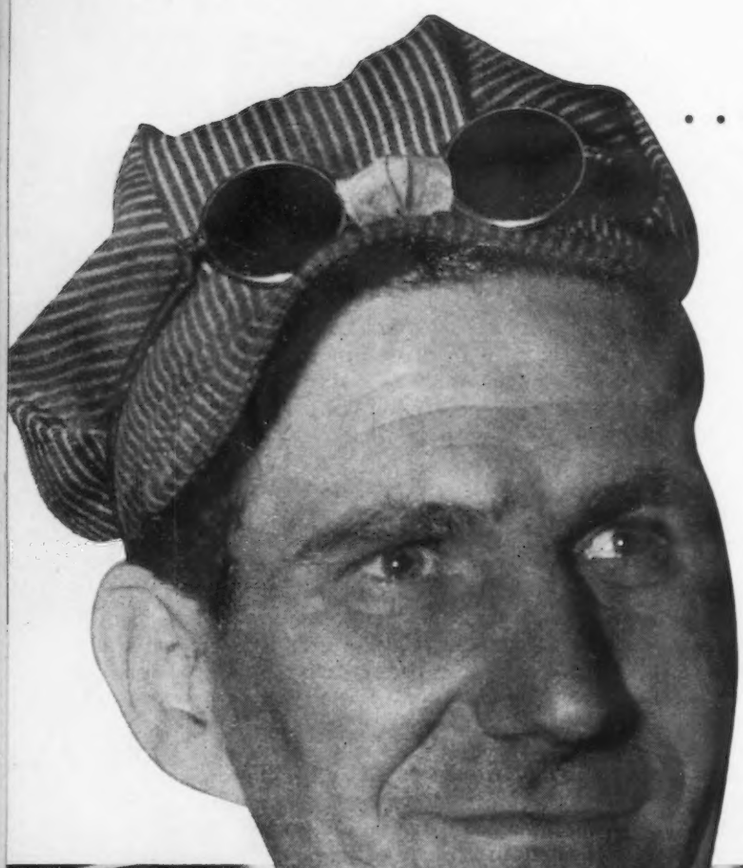
Thus, a minute quantity of radioactive sulphur, or phosphorus, or silicon, or copper (or any other element) may be mixed with a large amount of the nonactive element (or compound) and the distribution of the resultant mixture detected and traced throughout a steel ingot, piece of finished steel or brass diecasting. By this means, the complex and baffling reactions at the slag-metal interface in the open hearth may well become an open book. New investigations will give better understanding of the carburization and heat treatment of steels. The crystalline structures of complex nonferrous alloys can be explored in the minutest detail. Micro-metallurgy and the study of inclusions in steel suddenly become an easier task. The technician will peer through the walls of metals to probe the subtleties of wear and fatigue.

The metallurgist, the refractory engineer and the fuel engineer are on the threshold of a new and exciting era. The start has been made at the Carnegie Institute of Technology and at M.I.T. Interest is stirring in many laboratories throughout the metalworking industry. Within a decade, the radio-isotropic graph may take its place alongside or in place of the common laboratory tools of chemical analysis, the microscope and X ray.

T. W. Lippert

Under his Watchful Eye

. . . 6 open hearths



This is Larry McCoy, 34, melter at Inland's No. 2 Open Hearth. Larry started as a laborer in 1936, and in ten years moved up from third, second, and first helper, to melter. He's now responsible for the quality of 1600 tons of Inland steel every day.

McCoy is another of Inland's capable, conscientious men, who have learned steelmaking from the bottom up. The skill and judgment of these men is reflected in every ton of Inland steel.

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► While some steel earmarked for export has found its way into the domestic gray market, it is now known that the amount is small in contrast with the hundreds of thousands of tons originally intended for domestic use that have been exported during the past 6 months. And while American gray market prices may be fantastic, they are trifling compared with the profits being reaped by some of the smaller independent export houses.

► Britains expect to have an experimental atomic power plant within the next 5 years but an additional 5 years will probably be required before enough is known about it to build a commercial plant.

► If the past is any criterion the latest FTC case against the steel industry may be in the courts for many years. The last big case was started in 1924 and is still in the United States courts.

► Construction of at least one American cargo ship equipped to handle machinery or other items weighing 50 tons or more is in the cards for the future. A U. S. steamship firm is quietly surveying the market for the export potential in this line. Currently only one ship (Norwegian) can handle such material except at well equipped docks--and the war left few such docks in most foreign ports.

The French, however, have begun taking delivery of a $6.5 million order for 70 cranes from Barium Steel Corp. for rehabilitating their ports.

► The consensus in Detroit is that present huge backlogs will permit major manufacturers to take their time about introducing real postwar models. As soon as one major producer breaks the ice, announcements by others are expected to follow quickly.

Meanwhile the next several months should indicate what to expect on styling in the near future as die orders are placed. Generally, 6 months will elapse between placing of orders for dies and actual production.

► Swiss reports say the Gillette Co. will within a few weeks start construction of a Swiss plant to make razors and blades.

► There are recurrent signs that fabricators' inventories of steel and nonferrous metals are not large as a result of close control and constant efforts to iron out unbalance. In the past, during periods preceding a sharp drop in output most consumers held large stocks.

► Nylon gears recently tested in a kitchen mixer showed practically no wear after a 24-hr run with the beaters turning in a bowl of sand. Bronze gears on a similar test were worn out at the end of that time. Three months later, after 2400 hr of continuous operation the nylon gears were still running and showed very little sign of wear.

► An Ohio company, limited to a 15 kva power line load, is using storage battery powered projection welders to produce 14,000 phonograph turntables a day. The plant employs 75 production workers on a 2-shift basis and uses purchased power only for charging the storage batteries.

► Aviation-type moisture proofing of ignition systems may be featured in several postwar cars. Distributors will be sealed and wires and spark plugs will probably be encased in metallic sheaths to protect them against dew, fog, etc.

► Past shouts of the Pressed Metal Institute members sounded like whispers compared with the latest explosions at a recent Philadelphia meeting. They assert that the only way they can keep many plants running is by buying ingots at $75 to $80 a ton and going through involved conversion deals that run their sheet cost to about $150 a ton.

► The iron powder market is in a state of flux with two producers of low cost high grade iron powders about to come into large scale production. A number of new producers have entered the field recently--including the state of Minnesota.

► A neat way of measuring foundry sand is with an ammeter. A hopper discharges sand onto a power driven belt and when its driving motor is drawing 80 amp the operator cuts off the sand supply, knowing that he has 1400 lb of sand on the belt ready to deliver to the mixer.

► In the year that the British "covenant" scheme to eliminate the black market in new cars has been in effect, 133,000 covenants have been signed with satisfaction reported by both the industry and the public.

Economics Of The Blast Furnace

Top Pressure

+ Beneficiation

+ Oxygen

Decreases in ore quality and coal and coke quality, said to have already caused a 10 pct drop in blast furnace productivity, are emphasizing the necessity for radical alterations in blast furnace operating techniques to increase the productivity of the blast furnace. Data presented in this significant article indicate the productive and economic aspects of blast furnace operation with high top pressure, and also operations combining top pressure, beneficiated ores and oxygen enriched blast. The calculations presented by the authors indicate that a combination of the three measures should make it possible to double the output of a furnace.

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By B. S. OLD, A. R. ALMEIDA, R. W. HYDE
and
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THE blast furnace has come into its own as the key operation of the steel industry today. The economic situation is such that a demand for additional tonnage is aimed in the direction of the blast furnace superintendent. As the use of oxygen in the openhearth expands to decrease heat time and increase hot metal needs, this demand will become more intensive. The views of management toward the blast furnace are also aimed at for obtaining decreased coke rate and flue dust production. The operation of the blast furnace under high top pressure offers the opportunity of improving performance in all three of these basic economic operating factors.

J. H. Slater[1] recently described the results obtained by Republic Steel Corp. when operating two blast furnaces at high pressure in accordance with the method suggested by Avery[2]. This present article reviews some of the data presented by Slater, and estimates the results which would be obtained by operating a blast furnace at still higher pressures, combining oxygen-enriched blast with high top pressure, and using beneficiated ore with oxygen-enriched blast and high top pressure. These estimates indicate that by a combination of all three measures it should be possible to double the output of a furnace.

Slater[1] stresses the flexibility of blast furnace operation introduced by means of pressure operation. It is shown that the mean calculated linear velocity (see Methods of Calculation) of the reducing gases through the working volume of the furnace can be altered materially by throttling the exit gases to vary the internal pressure. Thus the operator has open to him the following alternatives:

(1) Blow the furnace at substantially higher wind rates and maintain the gas velocity through the furnace at the normal value.

(2) Blow the furnace at the normal wind rate and reduce substantially the gas velocity through the furnace.

(3) Blow the furnace at an intermediate point obtaining a material increase in wind rate while maintaining the gas velocity well below normal.

The important points with respect to this new control of gas velocity through the furnace working volume are:

(1) By decreasing the mean linear furnace gas velocity and maintaining it less than the normal, one can carry a higher burden ratio (lb ore per lb dry coke), as shown in fig. 1. This is because more effective use is made of the reducing gases through the longer time (less channeling) of gas-ore contact and better gas distribution achieved in the stock column. In other words the coke rate can be decreased. Confirmation of this low coke rate at low linear gas velocities will be found in the experience during the depression with slack wind operation.[3]

(2) By decreasing the gas velocity below a critical value of about 4.5 fps just above the stock line, the amount of flue dust produced per ton of iron can be materially decreased.

(3) By increasing the wind blown, without at the same time increasing gas velocity (by increasing the top pressure), substantially more pig iron can be produced per day.

Thus, as far as operating costs are concerned, the main effects of sufficient top pressure to maintain gas velocities through the charge at less than normal rates are: tonnage increases so that cost decreases, coke rate decreases, flue dust production decreases, and blowing costs increase. Altering wind blown and top pressure permits a flexibility of blast furnace operation never before possible and allows one to vary these cost factors so that the operation can be aimed, for example, at increasing iron tonnage or decreasing cost per ton of iron.

Calculations on Pressure Operation

The benefits which may be derived in the near future from pressure operation of the blast furnace can be estimated from the experience already evolved by Republic Steel Corp.

It should be clearly understood that calculations concerned with the blast furnace are hazardous at best. The many variables involved make it risky to predict the overall effect of altering one or two of the parameters. Perhaps the best example of this is the furor caused when pressure operation was originally discussed, with experts split into widely varying camps as to its probable effect on blast furnace operation. It took trial operations

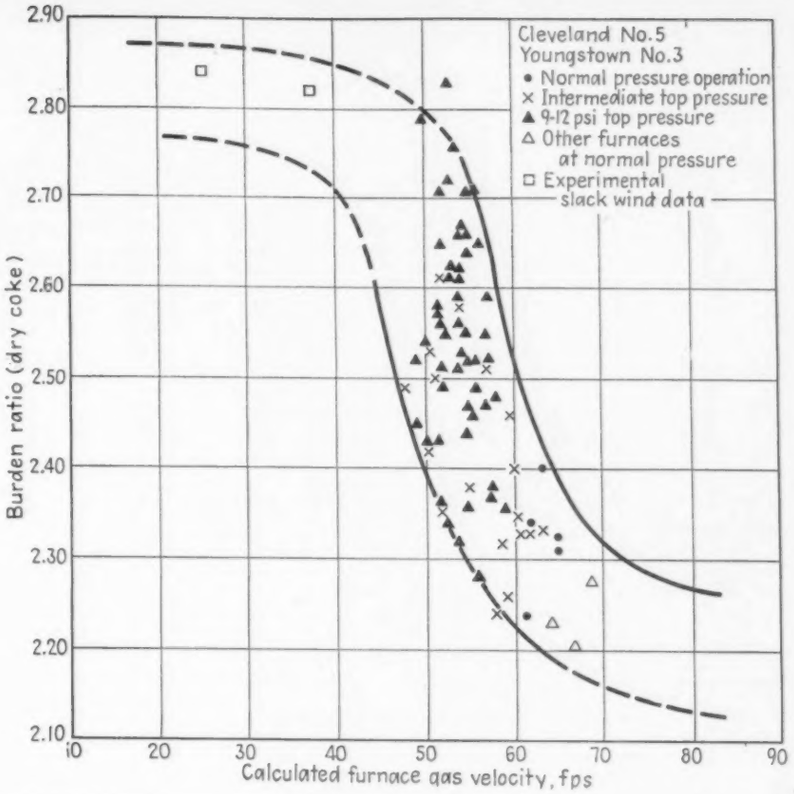

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FIG. 1—Curves showing relationship between burden ratio and calculated furnace gas velocity for various pressure conditions.

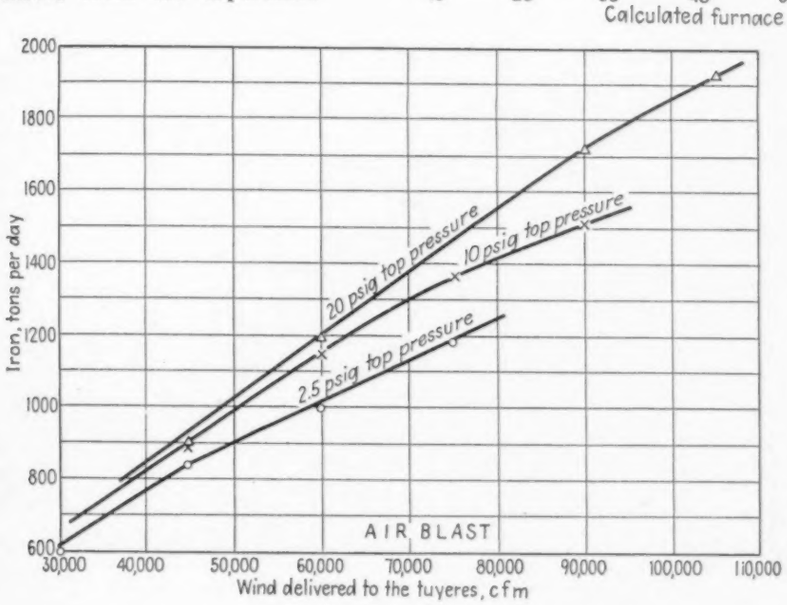

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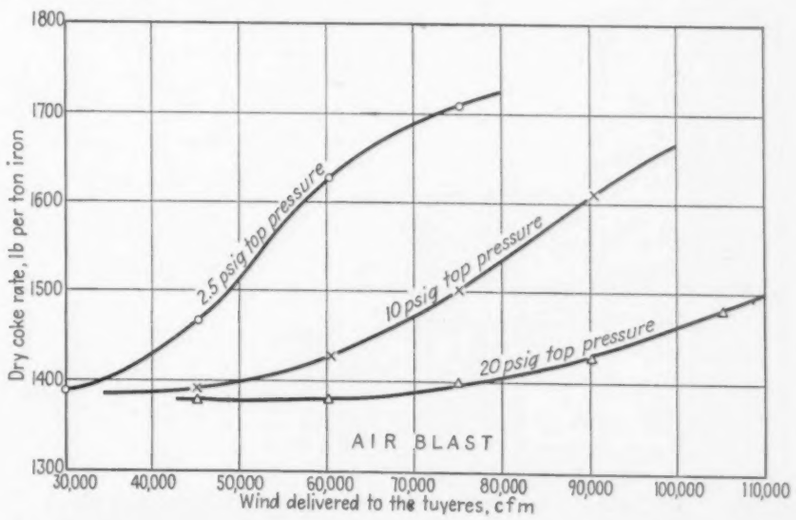
FIG. 2—Curves indicating the effect of various top pressure conditions on the relationship between iron output and air blast.



BELOW

FIG. 3—Curves indicating the effect of various top pressure conditions on the relationship between dry coke rate and air blast.

TABLE II

Normal and Pressure Operation With Air Blast

Wind, Cfm	Top Pressure, Psi	Average Furnace Vel., Fps	Burden Ratio (Dry Coke)	Iron, Tons per Day	Dry Coke Rate	Flue Dust, Lbs per ton iron	Top Temp., °F
45,000	2.5	50	2.65	837	1468	150	215
	10	37	2.79	883	1394	40	215
	20	27½	2.83	895	1380	25	215
60,000	2.5	59	2.39	998	1632	180	230
	10	45	2.72	1150	1429	90	230
	20	34	2.80	1196	1380	30	230
75,000	2.5	67	2.28	1187	1710	270	315
	10	52	2.59	1359	1502	160	315
	20	40½	2.77	1467	1402	50	315
90,000	2.5	.....	*	.....	.....	.....	.....
	10	58	2.42	1520	1608	180	400
	20	46	2.72	1724	1430	90	400
105,000	2.5	.....	*	.....	.....	.....	.....
	10	64	2.31	1690	1680	240	475
	20	51	2.62	1935	1480	140	475

* Furnace operation impractical under these conditions.

at Republic Steel, the first of which were sponsored by the War Metallurgy Committee,[4,5] to determine the actual effects of pressure operation. The trial operations of the past 11 months on the Republic Cleveland No. 5 and Youngstown No. 3 furnaces have presented what is believed to be rather firm ground on which to base further calculations.

Thus, if one assumes a 27-ft hearth furnace as described by Slater[1], operating on a straight Lake ore burden (60 pct Mesabi, 40 pct Old Range ore; 50 pct Fe in burden), one can base calculations on the results already obtained, as summarized in table I.

Computations of production characteristics over a wider range of conditions are carried out

TABLE I

Summary of Cleveland No. 5 Operating Data

	Normal Operation, 1944	Normal Operation, July 22-31, 1946	Pressure Operation, Sept. 22-Oct. 19, 1946	Pressure Operation, Jan. 1-31, 1947
Iron, net tons per day, actual tonnage	1273	1169	1435	1422
Coke, lb (dry) per ton iron	1673	1746	1494	1635
Stone, lb per ton iron	951	973	824	1018
Flue dust, lb (dry) per ton iron	270	213	145	170
Slag, lb per ton iron	1098	1156	1143	1125
Wind, cfm (turbo) planimetered	83,200	76,800	85,700	98,000
Wind, cfm, calculated	78,000	72,200	73,400	83,000
Burden ratio, wet	2.32	2.27	2.52	2.36
Burden ratio, dry	2.57	2.40	2.68	2.57
Top pressure, psi	2.0	3.1	9.7	9.7
Blast pressure, psi	22.7	21.5	28.2	30.5
Top temperature, °F	243	298	306	302
Blast temperature, °F	917	936	1191	1043
Steam temperature °F	.....	678	684	670
Pressure, psi	.....	287	286	283
Flow, lb per day (27 in. vacuum)	.....	1,555,000	1,974,000	2,556,000
Rate, lb per 1000 cfm	.....	14.1	16.1	18.1
Lb steam per ton iron	.....	1331	1374	1790
Wind off time, min per day	21	55	20	38
Top gas, CO/CO_2	1.90	.....	1.64	1.84
Btu per cu ft	89.3	.....	86.5	90.4
Coke analysis:				
Sulfur, pct	0.8	1.1	1.13	1.10
Ash, pct	10.1	12.0	10.7	10.3
Moisture, pct	10.3	5.3	5.6	8.2

on this basis and the results obtained are outlined in table II and plotted in figs. 2 and 3. Cost calculations, as plotted in fig. 4, were based on typical Cleveland data and included in the computations were all the major cost factors affected by pressure operation. No allowance is made for any capital cost gains, nor the present additional cost advantages gained with increased hot metal output, arising from the differential cost between scrap and pig iron, nor for additional profit gained through increased steel production.

There are several interesting things about these data. In the first place it will be seen that iron tonnages increase materially as the wind volume and top pressure are increased. The amount of wind which can be blown is limited to about 80,000 cfm delivered under normal operation, because of the excessive amount of flue dust produced and the high pressure drop developed through the furnace. Pressure operation allows much higher wind volume to be blown and higher iron tonnages to be produced before such limitations are reached. Substantial benefits can also be obtained from pressure operation without any increase in wind blown. The coke rate increases as the wind increases, but with an increase in top pressure this disadvantageous trend is partially overcome, as shown in fig. 3, since one shifts to a lower coke rate curve. In fig. 4 these factors are combined to show the overall manufacturing cost. These cost data reflect the balance between cost above which decreases as production increases, and raw material costs, which increase for any given top pressure as the wind is increased. The beneficial effect of pressure operation is again evident. It should also be noted that the optimum point in manufacturing cost continually moves toward higher wind volumes as the top pressure increases.

By way of example, one can explore the possibilities now presented by pressure operation with the new 125,000 cfm, 40 psig turboblower to be delivered to Republic Steel by

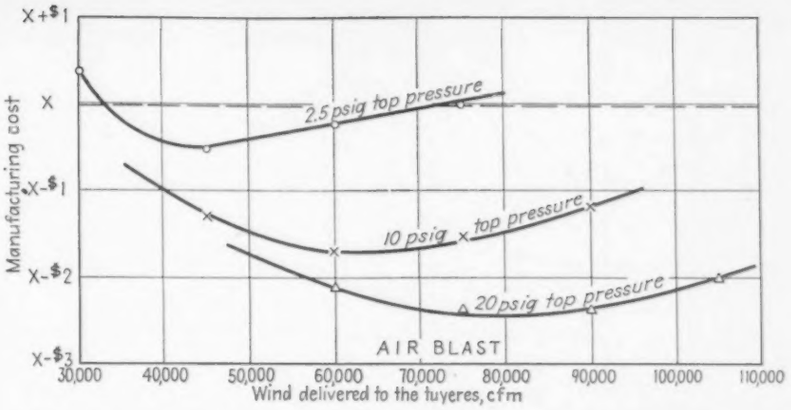


FIG. 4—Curves indicating the effect of various top pressure conditions on the relationship between manufacturing cost and air blast.

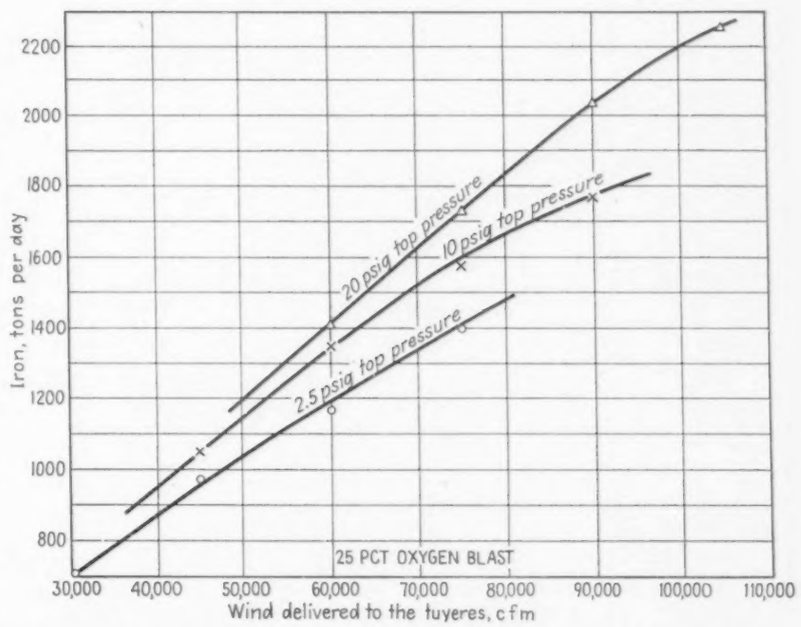


FIG. 5—Curves indicating the effect of various top pressure conditions on the relationship between iron output and 25 pct oxygen blast.

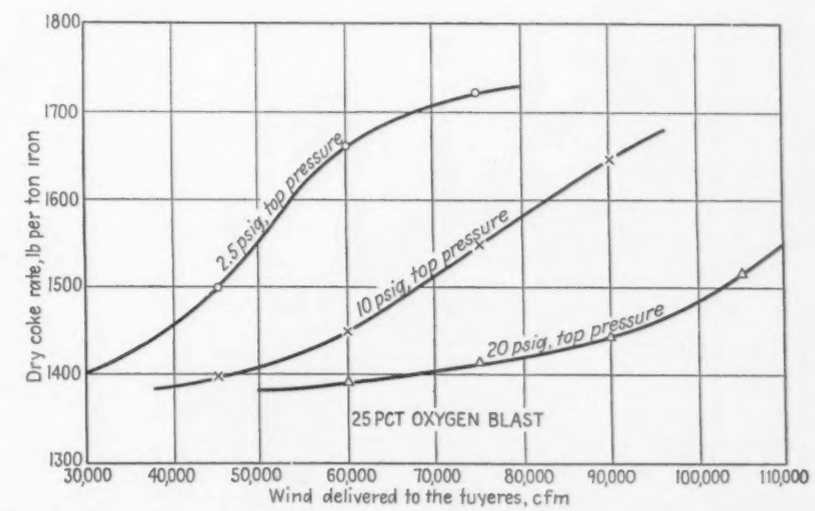


FIG. 6—Curves indicating the effect of various top pressure conditions on the relationship between dry coke rate and 25 pct oxygen blast.

Ingersoll-Rand in the near future. Referring to figs. 2, 3 and 4, it appears possible, allowing for about 10 pct wind loss, to produce from a straight ore burden about 2000 tons of iron per day at a dry coke rate of 1500 lb per ton of iron, with a cost saving of approximately $1.90 per ton, when operating at 20 psi top pressure and 125,000 cfm at the turboblower. These figures are impressive when compared with the normal output of about 1170 tons per day at a dry coke rate of 1745 at 76,000 cfm at the turboblower. Or, to show the flexibility of the process, it should be possible during times of economic stress to operate at optimum conditions of about 80,000 cfm calculated wind at 20 psi top pressure and effect further cost saving.

TABLE III

Operation With Oxygen Enriched Blast With Normal and High Pressure

Delivered Wind, Cfm	Top Pressure, Psi	Average Calculated Furnace Vel., Fps	Burden Ratio (Dry Coke)	Iron, Tons per day	Dry Coke Rate	Flue Dust, Lb per ton iron	Top Temp., °F
25 pct Oxygen Blast							
45,000	2.5	52	2.60	977	1497	160	215
	10	38½	2.78	1049	1399	45	215
	20	28½	2.82	1063	1380	25	215
60,000	2.5	62	2.34	1168	1660	200	250
	10	47½	2.69	1351	1447	160	250
	20	36	2.79	1412	1391	50	250
75,000	2.5	70	2.26	1400	1720	310	355
	10	55	2.52	1576	1544	180	355
	20	42	2.75	1736	1412	70	355
90,000	2.5	**	....	....	....	...	...
	10	60	2.37	1765	1643	200	425
	20	47½	2.70	2039	1440	140	425
105,000	2.5	**	....	....	....	...	...
	10	66½	2.29	1987	1702	250	470
	20	53	2.57	2250	1515	170	470
30 pct Oxygen Blast							
60,000	2.5	69	2.30	1364	1688	250	285
	10	49½	2.66	1592	1468	160	285
	20	37½	2.78	1690	1393	40	285
75,000	2.5	**	....	....	....	...	...
	10	57½	2.43	1820	1600	190	390
	20	44½	2.73	2065	1420	90	390
90,000	2.5	**	....	....	....	...	...
	10	64	2.32	2060	1678	250	475
	20	50½	2.64	2380	1473	180	475
105,000	2.5	**	....	....	....	...	...
	10	70	2.26	2350	1722	310	500
	20	56	2.48	2600	1568	220	500
40 pct Oxygen Blast							
60,000	2.5	71½	2.25	1789	1728	310	350
	10	54½	2.51	2050	1550	190	350
	20	41½	2.77	2210	1408	55	350
75,000	2.5	**	....	....	....	...	...
	10	63	2.33	2320	1670	230	455
	20	49	2.68	2700	1450	160	455
90,000	2.5	**	....	....	....	...	...
	10	70	2.27	2700	1717	300	500
	20	54½	2.51	3010	1550	200	500
105,000	2.5	**	....	....	....	...	...
	10	**	....	....	....	...	...
	20	61	2.37	3300	1643	250	550

** Furnace operation impractical under these conditions.

These production and cost figures do not appear to be too unreasonable when it is recalled that Slater[1] has already demonstrated cost savings of about $1.50 per ton at 86,000 cfm at the turboblower (73,400 calculated) and 10 psi top pressure while producing 1435 tons of iron at a dry coke rate of 1494. Top pressures of 12 psi and wind volumes of 115,000 cfm have already been attained at Cleveland No. 5. Delay time has been reduced to approximately "normal" values and new mechanical developments promise still further reduction.

If there is any one thing that most blast furnace men agree on, it is that the quality of coal and coke is diminishing with no apparent relief in sight. Also a serious shortage of coke faces most steel companies and many foundries.

The decrease in flue dust produced during pressure operation is readily apparent from table II. In view of the high percentage of fines in the ore now being utilized in this country, this factor of less flue dust is also a compelling one, favoring the use of high top pressure.

In order to evaluate the conversion from an investment standpoint, the engineering costs involved in converting a blast furnace to pressure operation must now be compared with the calculated manufacturing cost saving. Providing proper blowing equipment is available, the total cost of equipment to permit alteration of a blast furnace to pressure operation is only about $75,000 exclusive of labor costs. When this is compared with manufacturing cost savings, it is seen that, allowing for liberal labor costs, etc., the entire installation can be written off within 4 months. If new blowing equipment and steam installations are needed, the cost of conversion may, in extreme cases, be as high as $1.3 million. Even in this event the investment can be written off well within the 2 to 3-year period currrently required by most steel companies for amortizing new equipment. In the case of new construction the provisions required for pressure operation may be incorporated without additional cost.

RIGHT

FIG. 7—Curves indicating the effect of various top pressure conditions on the relationship between manufacturing cost and 25 pct oxygen blast. X = manufacturing cost for 75,000 cfm air blast at 2.5 psig top pressure.

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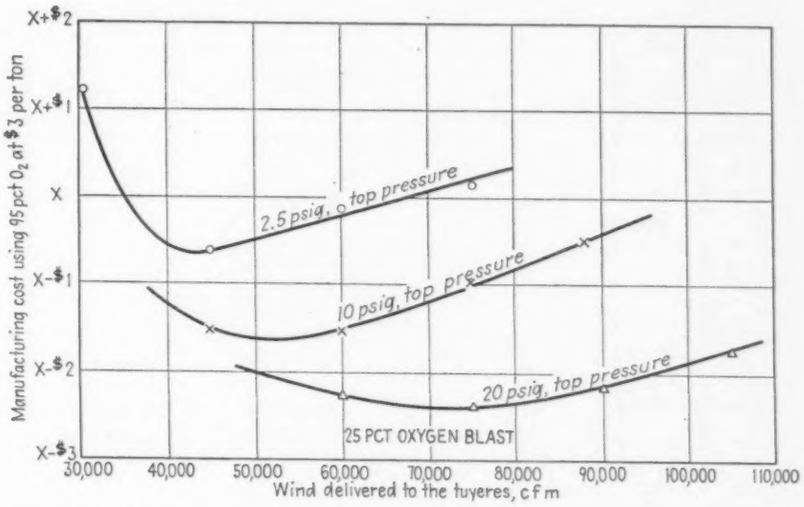
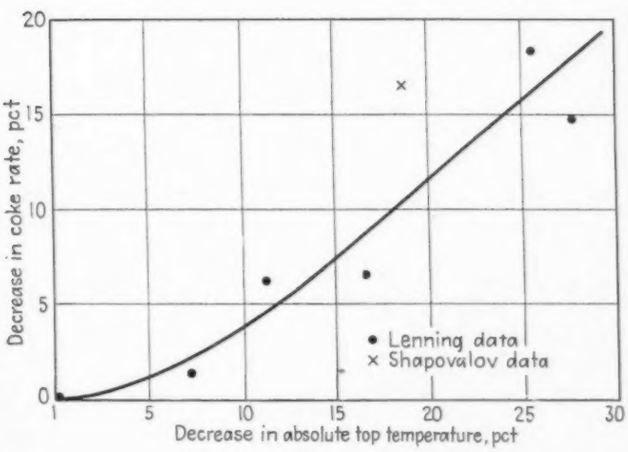
BELOW

FIG. 8—Curves indicating comparison of Lennings data and Shapovalov data for decrease in coke rate v. decrease in absolute top temperature.





Combining Pressure Operation and Oxygen Enriched Blast

It was previously acknowledged that blast furnace calculations are often lacking in accuracy. This is especially true when exploring a new field such as that of enriched-air blast. The reported experience with oxygen-enriched blast is limited to one German[6, 7] and one Russian[8] blast furnace trial on small furnaces (7 9/10 and 10 1/3 ft hearth diam) having burdens differing widely from our Lake ores. Thus the basis for taking into consideration the effect of oxygen enrichment on such things as optimum furnace size and dimensions; blast temperatures possible; coke rate; refractory life in the tuyere zone; top gas analyses; lost time delays; etc., is very limited. Despite these unknowns, it is interesting for purposes of comparison to estimate what might be accomplished with the use of oxygen, and many authors have already done so.[3, 10, 11]

Calculations were made on the effect of oxygen on production of a furnace of the same size and burden as that already described in the previous section. The method of calculation is shown later in this article. The only major point of difference from methods previously used is the manner of estimating the burden ratio. The results of the calculations are recorded in table III. These

TABLE IV

Manufacturing Costs for Various Conditions of Wind, Top Pressures and Oxygen Content of Blast Compared to Normal Cost per Ton of Iron

Top Press., Psi	Blast	Wind, Cfm	Tons, Iron	Coke Rate	Mfg. Cost Per Ton Iron @$3 per ton 95 pct O_2	Mfg. Cost Per Ton Iron @$5 per ton 95 pct O_2
2.5	25 pct O_2	67,000	1300	1690	X	X + 0.30
		82,000	1500	1730	X + 0.40	X + 0.70
10	Air	71,000	1300	1480	X − 1.60	.....
		89,000	1500	1600	X − 1.20	.....
10	25 pct O_2	58,000	1300	1440	X − 1.55	X − 1.30
		89,000	1500	1505	X − 1.25	X − 0.95
20	Air	66,000	1300	1380	X − 2.30	.....
		77,000	1500	1400	X − 2.45	.....
		89,000	1700	1430	X − 2.35	.....
20	25 pct O_2	55,000	1300	1385	X − 2.15	X − 1.95
		64,000	1500	1395	X − 2.35	X − 2.15
		74,000	1700	1410	X − 2.40	X − 2.20

Under normal operating conditions; air blast of 75,000 cfm and 2.5 psi top pressure and production of 1187 tons of iron at a coke rate of 1710 is expected. X = actual manufacturing cost for these conditions.

data and calculations of manufacturing costs are plotted in figs. 5, 6 and 7.

One important thing to note from these figures is that the use of oxygen alone, while permitting a substantial increase in iron tonnage, actually allows little or no coke saving. Thus one can obtain an increase of about 15 pct in tonnage over normal operation with no coke saving, or produce the same tonnage as normal while obtaining a 3.5 pct coke saving. There is a certain middle ground where one can produce more iron and save a small amount of coke, but the coke rate increases above the normal of about 1710 as soon as the tonnage increases more than 15 pct.

These calculations agree fairly well with the operating data of the Germans and Russians and with the calculations of other authors. At first glance it appears that the work of Lennings and Shapovalov indicates that not only will iron production increase but a large coke saving will also result from the use of oxygen. However, a careful analysis of their data leads to other conclusions.

TABLE V

Operation With Oxygen Enriched Blast, Beneficiated Ore*, and Normal and High Pressure

Wind, Cfm	Top Pressure, Psi	Pct Oxygen in Blast	Iron, Tons per Day	Dry Coke Rate
75,000	2.5	21	1306	1539
	10	21	1496	1471
	20	21	1613	1380
75,000	2.5	25	1540	1548
	10	25	1733	1513
	20	25	1908	1383
90,000	2.5	21	**	
	10	21	1672	1575
	20	21	1896	1401
90,000	2.5		**	
	10	25	1940	1610
	20	25	2243	1411
105,000	2.5		**	
	10	21	1859	1647
	20	21	2129	1450
105,000	2.5		**	
	10	25	2186	1667
	20	25	2475	1484

* 55 pct Fe in the ferrous burden.
** Furnace operation impractical under these conditions.

First, it should be pointed out that there are several difficulties in relating these data to basic iron practices in this country such as the following: Differences in ores and other raw materials; difference in iron compositions (Shapovalov made 10 to 14 pct FeSi); differences in blast furnaces' size; limited time of experimental operation; lack of certain data (Shapovalov fails to record wind volume); the bad habit of throwing out poor days; changing the burden (Shapovalov increased his scrap charge); the introduction by Lennings of heated top gas into the furnace shaft, etc. Despite these shortcomings it appears possible to determine the key to the coke saving found in these operations.

Thus Lennings states in his summary, "if there is no excess heat available, there is an increase in iron production, if oxygen-enriched blast is used; however, there is no reduction in coke consumption." Therefore, it was decided to plot the decrease in top temperature noted by Lennings and Shapovalov against the decrease in coke consumption obtained, as shown in fig. 8. It is clearly evident that coke was not saved unless top temperature was decreased substantially.

When this finding is applied to current practice in this country, it will be seen from tables II and III that top temperatures (see Methods of Calculation) are already low and no large decreases are possible, as troubles with sludge formation in the uptakes and dust catcher begin below about 235°F.[11] Taking water off the skips will help a bit in this regard, but probably not more than about 20°F. Still another factor in Lennings' coke saving on his small furnace is that his fixed heat losses have been cut down materially (approximately 7 pct) by his having increased production about 33 pct.

Therefore, the conclusion that little or no coke saving will occur with the use of oxygen-enriched blast on basic iron furnaces in this country appears sound. Other authors including Ramm,[12] Shapovalov,[8] Rocca and Bever,[13] Leibovich[14] and Johnson[10] agree with this belief. Haven,[9] on the other hand, claims a 20 pct increase in iron production and an 8 pct saving in coke.

How are the poor coke consumption prospects of the enriched-air blast to be overcome? A possible answer appears to be to combine pressure operation with oxygen enrichment. The calculations in table III and figs. 5 and 6 show the large beneficial effects of pressure operation on tonnage, coke consumption and flue dust production. These benefits are brought about largely by a reduction in gas velocity through the furnace. Thus with 25 pct oxygen, one is limited to a peak production of about 1500 tons per day at a coke rate of 1720 and a flue dust production of 355 lb per ton, whereas with 20 psi top pressure and 105,000 cfm one should be able to produce about 2250 tons of iron at a coke rate of 1515 and a flue dust production of 170 lb per ton of iron.

That any economies will result from the use of oxygen-enriched air in the blast furnace is still open to serious question. The present estimates on the cost of producing oxygen range from

about $11 down to as low as $3 per ton, depending largely on the local conditions of power cost, tonnages of oxygen produced and methods of accounting. In order not to prejudice the case against oxygen, the manufacturing cost of pig iron was calculated on the basis of $3 per ton oxygen, which is the most optimistic cost estimate.

When such costs are plotted, as in fig. 7, it is found that there is only a small range of wind values where any saving is to be expected when operating at normal top pressures with $3 oxygen. In order to compare the economics of high pressure operation and oxygen-enriched blast the calculated manufacturing costs for a series of conditions are given in table IV. Values for 30 pct and 40 pct oxygen air are omitted as they gave higher costs than for 25 pct oxygen air in each instance. It will be seen from this table that if iron tonnages greater than normal for the furnace, such as above 1300 tons per day, are desired, there is no manufacturing cost saving with $3 oxygen, and a small loss with $5 oxygen. In each case it is apparent that the use of high pressure operation with air is more economical than combined with 25 pct oxygen, and that the manufacturing cost of iron using an oxygen-enriched blast is always reduced by superimposing pressure operation. Further, it is noted that higher iron tonnages can be made with the combination process than with oxygen enrichment alone. In fact, the only really attractive point in favor of the oxygen enriched blast is when used in combination with pressure operation to shoot for production of the order of 2000 tons per day (fig. 5).

The investment for an oxygen plant must be considered next. Present estimates for a plant of about 250 tons per day, which would be required to service a 27-ft blast furnace, call for an investment of about $1.3 million. Thus it appears, on the basis of calculations which are readily admitted to be based on very sparse operating data, that the economic picture for oxygen enrichment as applied to basic pig iron production is not as attractive as for pressure operation, but that the combination of the two processes might become advantageous in the very high iron tonnage ranges. This will depend to a great extent on local conditions both as to the steel plant setup and cost of oxygen. The matter of using oxygen in connection with the production of ferroalloys has not been considered in this article. However, it would appear to be more attractive for use in such operations than for basic pig iron. This viewpoint is also held by Lennings,[6] Shapovalov,[8] Leibovich[14] and Ramm.[12]

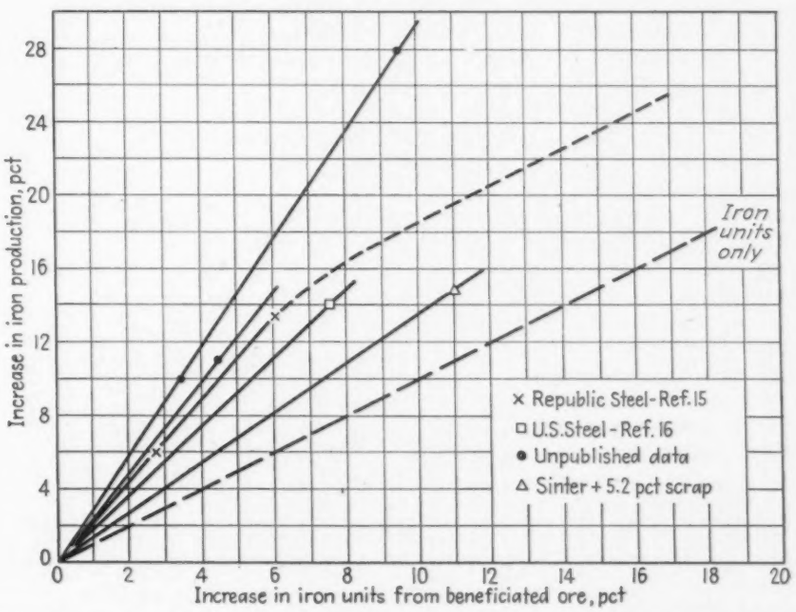


FIG. 9—Curves indicating the relationship of iron production and increase in iron units from beneficiated ore.

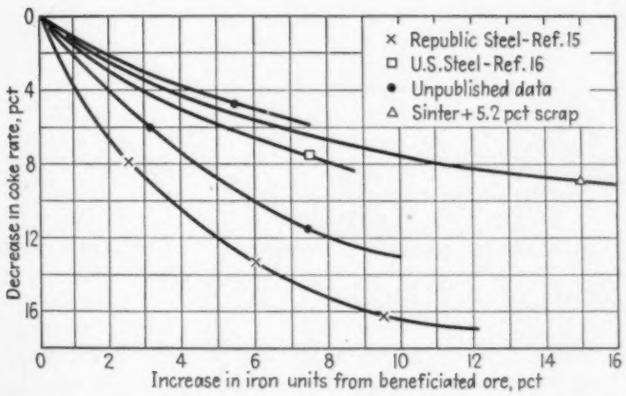


FIG. 10—Curves indicating relationship of coke rate and increase in iron units from beneficiated ore.

With blowers presently available and the structural limitations of the conventional blast furnace, the full advantage of pressure operation in the higher pressure ranges cannot be realized. By combining air enrichment with pressure operation it is possible to realize some of the benefits of operating at top pressures in excess of 20 psi. Another partially additive factor would be ore beneficiation.

Pressure Operation, Oxygen Enriched Blast and Beneficiated Ore

Several blast furnace men have asked if the benefits to be gained from the three operations are additive. The answer to this has to be hedged, as might be expected, and is best given as yes and no.

To review the gains to be made from beneficiation alone, published information,[15,16] which, incidentally is very limited, and some unpublished data on the effect of ore beneficiation on iron production and coke rate, are plotted in figs. 9 and

10. It is evident from fig. 9 that the use of sinter or sized ore, nodules and scrap up to a point, increases iron production of a blast furnace an amount over and above that which would be obtained just from the increase in iron units (pct Fe) in the burden from the iron-rich materials. This is probably a result of increased porosity of the charge which brings about better gas distribution in the stock column and hence allows a higher burden ratio to be utilized. Beyond about 45 pct sinter this effect seems to disappear so that the only gain in iron production is one of increased iron units.

Fig. 10 shows that the coke rate decreases with increasing sinter in the burden and then begins to level off. This would be expected because the beneficial effect of better gas distribution in the stock column on the coke rate tends to decrease as the coke rate approaches a lower limit established by the thermal requirements of the smelting process. Various furnaces charging high sinter or sized ore burdens at the present time report coke savings of 5 to 12 pct.

No reliable cost data are available on the various beneficiation methods with the exception of sintering. The cost of sinter is such that it is only a little higher than ore, iron unit for iron unit. Thus it is apparent that a manufacturing cost saving will result from the use of sinter as there is a gain in tonnage over and above the iron unit increase and a saving in coke.

Suppose that beneficiated ore is used in conjunction with pressure operation. It is obvious that iron production can be increased as the wind blown can be increased. The same thing can be said with respect to adding oxygen-enriched blast. Furthermore, the amount of flue dust produced will be reduced when pressure operation is used. What will happen to the coke rate is open to debate. It is doubted that the coke savings from pressure operation and ore beneficiation will be directly additive. However, it is believed they will be partially so. Therefore, as a conservative basis for calculations, the iron tonnage increase was assumed to be additive on the basis of increased iron units, and the coke rate decrease was assumed to be additive only to the extent of 20 pct (i.e. total coke saving = coke saving A + 20 pct coke saving B). The results of these calculations are given in table V.

The magnitude of calculated iron tonnage capable of being produced from a 27-ft hearth furnace with the "jackpot combination" is certainly in the eyebrow raising range. The problem of filling the furnace is obviously one for the engineers to start worrying about. In fact the design of the furnace might have to be altered radically.

Methods of Calculation

The following methods were used to calculate expected production of basic iron and coke rates for any given set of conditions including pressure, oxygen enrichment, and a combination process involving both pressure and oxygen enrichment.

The first step in the method involves the calculation of average gas velocity through the charge in the stock column by the following formula:

$$V = W \times F_g \times \frac{1}{A} \times C_p \times C_t$$

Where V = gas velocity fps; W = blast volume cfs measured at 60° F and 14.7 psi; F_g = calculated gas expansion factor (pct N_2 in blast/pct N_2 in top gas); C_p = Absolute pressure correction (14.7/average absolute static pressure in the furnace). Average absolute static pressure in furnace $= \frac{\text{top pressure} + \text{blast pressure}}{2} + 14.7$; C_t = absolute temperature correction (average gas temperature is the stock/520° R [60°F]). Average gas temperature in the stock $= \frac{\text{gas temp. at tuyeres (2800° F)} + \text{top temp.}}{2} + 460°\text{ F}$; A = Effective area in sq ft available for gas passage (10 pct of working volume of furnace/working height) (10 pct = effective voids from the work of Kinney, U. S. Bureau Mines T.P. 459).

Sample Calculations:

$$\frac{75{,}000}{60} \times \frac{1.35}{54} \times \frac{14.7}{26.4} \times \frac{2010}{520} = 67.2 \text{ fps}$$

75,000 = calculated wind cubic fpm

$$1.35 = \frac{\text{Pct } N_2 \text{ in blast}}{\text{Pct } N_2 \text{ in top gas}} = \frac{79}{58.5}$$

$$54 = \frac{\text{furnace working volume, sq ft}}{\text{furnace working height, ft}} \times 0.1$$

(10 pct effective voids)

$$26.4 = \frac{21 + 2.5}{2} + 14.7 = \frac{\text{blast pressure} + \text{top pressure}}{2} + 14.7$$

$$2010 = \frac{2800 + 300}{2} + 460 = \frac{\text{gas temp. at tuyeres} + \text{top temp.}}{2} + 460$$

$$520 = 60 + 460$$

The calculated velocity is now used to determine the average burden ratio the furnace will be able to carry running with straight ore burden for basic iron from fig. 1. For example, a velocity of 67.2 fps permits a dry coke burden ratio of 2.275. Since burden ratio controls coke consumption, coke rates may now be calculated by the following formula:

$$\text{Coke rate} = \frac{2000 \times (\text{pct Fe in pig})}{E\ (\text{pct Fe in burden}) \times \text{burden ratio}}$$

Where pct Fe in pig is taken as 92.5 pct; E = metallurgical efficiency 95 pct; Pct Fe in burden = average pct Fe in iron bearing charge taken as 50 pct; burden ratio determined from figure P and calculated velocity.

Example:

$$\text{Coke rate} = \frac{2000 \times .925}{0.95 \times 0.50 \times 2.275} = 1710 \text{ lb coke per ton pig}$$

Knowing the coke rate one can now calculate the theoretical daily production by the following formula:

$$\text{Tons per day} = \frac{W \times (\text{pct } 0_2) \times 24 \times 1440}{\text{lb mol volume } [(CR \times 0.865) - 89]\, 0.87}$$

Where W = wind, cfm (60° F and 14.7 psi); lb mol volume at 60° F and 14.7 psi = 379.5; 1440 = min per day; 24 = 2 lb mols carbon = 1 lb mol oxygen to carbon

monoxide; CR = lb dry coke per ton Fe; 89 = lb of carbon n ton pig iron; 0.865 = pct fixed carbon in coke (ultimate analysis of current coke); 87 = pct carbon burned at tuyeres, assuming a solution loss of 13 pct. This is an average solution loss figure from the results obtained by Slater[1]. Lennings' results with oxygen showed a solution loss of about 13 pct and showed very little change from normal.

Example:

$$\frac{75{,}000 \times 0.21 \times 24 \times 1440}{379.5 \times [(1710 \times 0.865) - 89]\,0.87} = 1180 \text{ tons per day}$$

The results obtained by this method of calculation check closely with the data obtained by Slater[1] for both normal and 10 lb top pressure on a 27-ft hearth furnace.

The data for calculating top temperatures were taken from fig. 20 in the Slater[1] paper. The top temperature data were replotted as a function of the mass rate of gas flow through the furnace working volume to give a single linear relationship.

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A New Microhardness Tester

THE "Microsclerometer L. C.," a new microhardness tester, by the use of which it is possible to test the hardness of very hard and brittle substances, such as glass, enamels, and numerous natural minerals (which under the usual loads would disintegrate without any possibility of obtaining a measurable imprint), is described in *The Engineers' Digest*, August 1947.

Despite progress made in the field of hardness testing, there are still problems with which the usual type of hardness tester cannot cope; i.e., when the imprint obtained with the lightest test load exceeds the dimensions of the test piece, as in the case of testing the hardness of a needle near its point, or of a razor blade near its cutting edge, or of watch springs, or very thin electrolytic deposits, or cemented or nitrated layers. The "Microsclerometer," designed by R. Girschig, is said to fill this gap, and to enable true microhardness tests to be carried out beyond early expectations. Thus, for example, it is possible to test the hardness of every individual micrographic constituent of an alloy, without the indention overlapping the contour of each grain examined.

This possibility amounts to progress beyond the sphere of normal hardness testing, because it permits more reliable identification of the phases visible under the microscope and an assessment of the contribution of each constituent to the mechanical characteristics of the alloy (i.e., measurement of the hardness of the matrix and crystals in antifriction materials). It is possible to follow up the variations of the hardness of a single constituent, as a function of special alloying additions, or of the heat treatment the material may have been subjected to as an investigation of the carburization of steels, etc., or to make apparent the effects of work-hardening after machining, mechanical polishing of metal surfaces, and to define as a mechanical characteristic the surface condition of a material the microstructure of which is already known.

Hollow Tap Shanks Cut Tool Costs

TAPS coupled to 30 pct lighter hollow shanks produced from steel tubing with an internally broached spline are reducing tool costs and making the job easier for tapping machine operators, according to Detroit Tap & Tool Co.

The new shanks are said to be particularly useful in operations such as tapping pipe couplings where fairly long shank taps are used to tap through several parts at a time, allowing the parts to load up on the shank. The practice in such cases is to remove the loaded tap from the quick change type chuck to unload the parts. With solid shank taps this represents considerable physical effort in a day's run of parts. Another improvement on the new shank is a knurled portion on the OD to assist an operator with wet or oily hands in removing the tap from the chuck. The cost of these nib taps is said to be 50 pct of the cost of solid taps of the same size, since only the nib requires replacement when worn.

● AISE PRESIDENT L. R. Milburn, electrical engineer, Great Lakes Steel Corp., Detroit.

Oxygen Use to Highlight AISE Annual Convention

FOUNDED 40 years ago for the purpose of advancing the technical and engineering phases of the production and processing of iron and steel, the Association of Iron and Steel Engineers, with its 3500 members, is looking forward to its 1947 Annual Convention to be held at the William Penn Hotel, Pittsburgh, Sept. 22, 23, 24 and 25, under the direction of L. R. Milburn, president.

Highlighting the some 37 technical papers to be presented will be the emphasis placed on the use of oxygen in the production of steel. Also of general interest to those in attendance will be the inspection trip to the Homestead Works, Carnegie-Illinois Steel Corp., at 9:00 a.m., Sept. 23, for the purpose of viewing new facilities in operation at that plant.

An address by C. R. Cox, president, Carnegie-Illinois Steel Corp., will be the feature of the annual dinner to be held Wednesday, Sept. 24, at 7:30 p.m. in the ballroom of the William Penn Hotel. Papers to be presented at the technical sessions of the meeting are listed below.

Technical Program of AISE Meeting

Monday, Sept. 22

Electrical Session—9:30 a.m., Urban Room—"Twin Motor Drives for Tandem Cold Strip Mills," "Operation and Maintenance of Variable Voltage Control Systems," and "Improved Reversing Mill dc Generators."

Rolling Mill Session—2:00 p.m., Urban Room—"The Y-Mill—A New Type of Cold Strip Mill," "Factors in the Operation of a Mannesmann Piercing Mill," and "Applications of the Basic Principle of Rolling in Roll Design."

Operating Practice Session—2:00 p.m., Cardinal Room—"Job Evaluation," "New Technique in Conditioning Stainless Steel," and "The Powder Process in Stainless Steel Production."

Tuesday, Sept. 23

Combustion Session — 9:00 a.m., Cardinal Room—"Uses of Oxygen in Steel Production," "Oxygen in the Openhearth," and "Agitation of the Openhearth Bath with Oxygen and Compressed Air."

Standardization Session—9:00 a.m., Urban Room—Committee reports.

Combustion Session — 2:00 p.m., Cardinal Room—"Oxygen and the Steel Industry," "Steam Generation and Maintenance of Power Stations for Steel Plants," and "Auxiliary Fuels in Gas Fired Steam Units."

Electrical Session—2:00 p.m., Urban Room—"Electric Heating of Steel Strip for Continuous Processing," "Trends in Lifting Magnet Design and Application," and "Glass Fiber Electrical Insulating Materials."

Wednesday, Sept. 24

Lubrication Session — 2:00 p.m., Cardinal Room—"Industrial Uses of Synthetic Lubricants," "Rolling Lubricants for Cold Mills," and "Barium Lubricating Grease."

Standardization Session—2:00 p.m., Urban Room—"Proposed New Crane Specifications," "Report on Crane Bridge Drive Specifications," "Research Report on Design of Crane Ladle Hooks," and "Research Report on Design of Hot Metal Ladles."

Thursday, Sept. 25

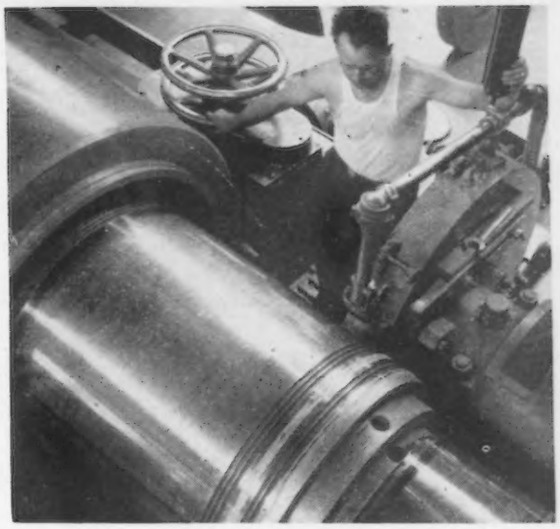
Mechanical Session—9:00 a.m., Urban Room—"Metals in Service," "Principles of Job Scheduling in a Machine Shop," and "Effects of Shot Peening and Cold Rolling on the Characteristics of Steel."

Operating Practice Session—9:00 a.m., Cardinal Room—"Preparation of Coal for Coke Production," "Coke Oven Machinery," and "Progress of High Top Pressure Operation of the Pig Iron Blast Furnaces."

Lubrication Session—2:00 p.m., Cardinal Room—"Lubrication of Rolling Mills," "Some Aspects of Lubrication Equipment Maintenance," and "An Improved Method for Mounting Bearings and Couplings."

Combustion Session—2:00 p.m., Urban Room—"Soaking Pits at Middletown American Rolling Mill Co.," "Multiple Fuel Burners for Openhearth Furnaces," and "Design and Performance of an Air Recuperator."

Reconditioning Hot Mill Rolls



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By R. S. TRIMBLE
Simonds Abrasive Co.
Philadelphia

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The latest techniques developed for the reconditioning of hot mill rolls are described in this two-part article. In this, the first part, the author discusses some fundamentals of roll grinding, the significance of various surface qualities and finishes, types of grinders available, selection of abrasive and bond, and the effect of changes of wheel speed on surface quality and finish.

IT is well known by every hot mill man that unless rolls are accurate and have proper surface quality and finish it is not possible to produce strip, sheet or plate that is up to specifications. Steel of even gage cannot be secured from rolls that have become out of round, eccentric with their journals, tapered or incorrectly crowned. The surface quality and finish of the strip, sheet or plate will be no better than that of the roll.

Part of the responsibility for keeping rolls in proper condition is on the rolling mill foreman or superintendent, for it is up to him to see that rolls go to the grinding department as soon as they need reconditioning. That is the only sound rule to follow. Exact time schedules for roll reconditioning are unsatisfactory because the governing factors are the surface quality required on the steel, the speed of the mill, the type of material being rolled, the penetration of the roll into the material and the pressure under which the rolls operate. Any or all of these may vary from job to job. On one job the working rolls may need to be reconditioned every 2 or 3 days. On a tougher job, every few hours should see the rolls back in the grinding department. In some four-high continuous mills running 24 hr a day, most of the working rolls may need reconditioning every 10 hr, while the working rolls in the last two stands, which give most of the finish, may require it even more frequently.

If the rolls are sent for reconditioning as soon as they need it, their accuracy, surface quality and finish are strictly up to the grinding department. Great skill is needed, for roll grinding is precision grinding of a high order.

First of all, the grinding department foreman must be told how accurate the rolls must be, and how good a surface and finish each one must have. That is of course dictated by the end use of the strip, sheet or plate.

It goes without saying that the rolled steel and therefore the rolls should have a surface quality and finish that is good enough. On the other hand it is needless and expensive to give a roll a superfinish when all that is needed is a good commercial surface, free from scratches, spiral feed marks, chatter or diamond marks. It takes a lot of time to build up the better finishes and surface qualities, which not only runs up labor costs but necessitates unduly large roll inventories because of the need for more frequent reconditioning and consequent downtime.

There is much misunderstanding and confusion over the terms *surface quality* and *finish*. They are often used interchangeably although actually they mean entirely different things. Surface quality has to do with the relative roughness of a surface as measured in microinches, and the condition of the surface as to burns, spalls and the various kinds of marks caused by unskillful grinding. Finish, properly speaking, has to do with the presence or absence of shine or luster given to the surface in the final grinding operations, and has nothing to do with the actual surface quality. Yet finish is commonly considered the important criterion of surface. This misconception is responsible for much poor roll grinding.

Thus a "mirror surface" may be due to the reflection of light from deep, narrow grit marks, which is just the opposite of a glass-smooth surface, as is commonly believed.

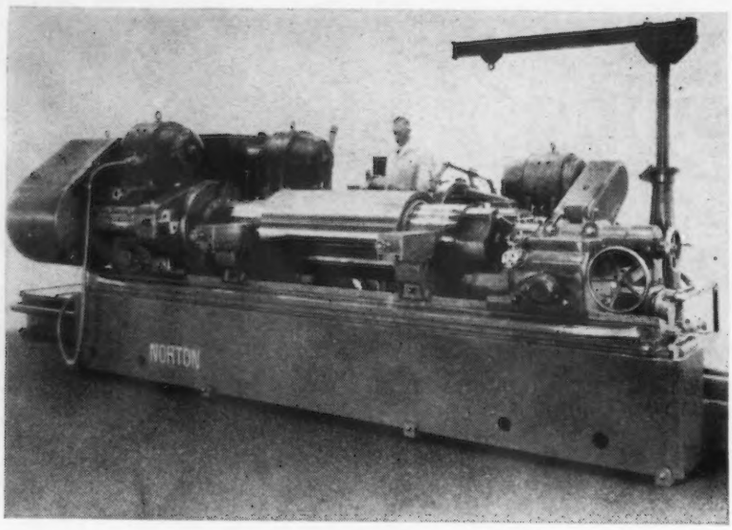


FIG. 1—A Norton 36x144-in. traveling wheel-type roll grinder. The wheel carriage is 18 ft long.

Shine may also be produced by final passes with a wheel which has been allowed to dull. The result is a burnishing action that merely folds down the high spots of ridges left by the earlier cutting action of the sharp wheel, and thus often gives a deceiving "mirror finish" to what may actually be a very poor surface. In use, the folded down ridges flake off and the rough underlying surface is reproduced on the steel. That often puzzles mill men who cannot understand why a shiny roll produces strip which has undesirable patterns.

But so convinced are many mill men that shine is invariably an indication of good surface quality, that they are prejudiced against rolls which have a dull, velvet or matte finish. Actually, such a surface may be of the highest possible quality. It is to be remembered that almost any desired finish can be applied to almost any surface. It is the quality of the surface that really counts.

Another cause of faulty surface quality in strip is the looseness of phraseology often used in specifying quality or finish. They are usually specified by such terms as "rough," "rough commercial," "commercial," "good commercial," "reflecting," "high," "ultra" and "high luster." The trouble is that these terms mean different things to different men. If the mill man and the roll grinding foreman don't get together and make sure they speak the same language, the mill man may get a roll that is either too poor or unnecessarily good for the job. Surface quality should be specified by microinches, rms. Selection can be made from samples of cylindrical ground surfaces which are marked with their microinch rating.

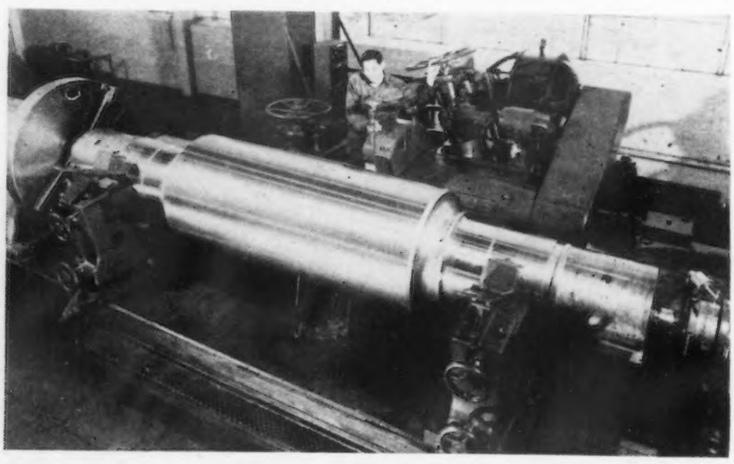
Most continuous hot mill working rolls come within the 10 to 15 microinch rms range. Back-up-rolls lie in the 10 to 20 microinch range.

Variations in gage of the rolled strip are often unfairly blamed on the roll surface due to uncorrected wear of the roll necks which causes the working surfaces of the roll to be eccentric with the roll necks. Roll necks should be reground often enough to maintain concentricity and to provide a bearing surface which will keep friction, and hence wear, at a minimum.

Roll necks are ground with the entire weight of the roll supported by centers. When this has been done, the weight of the roll should be shifted to the journal rests on the machine for reconditioning the working surface of the rolls. While heavy rolls are sometimes supported by both the rests and the centers, this is generally considered to be inadvisable, since the necks must be ground oftener to keep them concentric with the rolls. Necks are usually ground with the same machine setup and wheel as are used for grinding the roll surface.

For roll grinding, highly specialized cylindrical grinding machines have been developed, which are heavily and rigidly constructed to enable them to handle heavy work and to keep vibration at a minimum. They are made in both traveling table and traveling wheel types. Devices for automatically grinding rolls with crowned or concaved faces, or tapered necks, are provided with most machines. Accompanying photographs illustrate typical machines of both types.

FIG. 2—A Landis 60x112-in. traveling table-type grinder.



As in all cylindrical grinding, the quality and quantity of production depends to a great extent upon selecting the wheel that is best suited for the job as to type of abrasive, grain size, bond type, grade, and structure.

Since the working rolls in hot mills are made of chilled iron or chilled alloy iron which is hard and of comparatively low tensile strength, they are best ground with silicon carbide abrasive.

Steel backing-up rolls should

theoretically be ground with aluminum oxide wheels. In a shop large enough to have a great many backing-up rolls to grind, it is good practice to assign at least one roll grinding machine to that work exclusively and equip it with an aluminum oxide wheel. In smaller shops it is customary to grind the few backing-up rolls that need reconditioning with the same wheels as are used for the chilled iron working rolls. Properly manipulated, the silicon carbide wheels can be made to do satisfactory jobs on the steel rolls.

Resinoid is the preferred bonding agent for wheels used in grinding hot mill rolls, because it produces the types of finish and surface quality required, has a cool and free-cutting action which lessens the likelihood of burning the rolls, and lasts longer in service than would other types of bond.

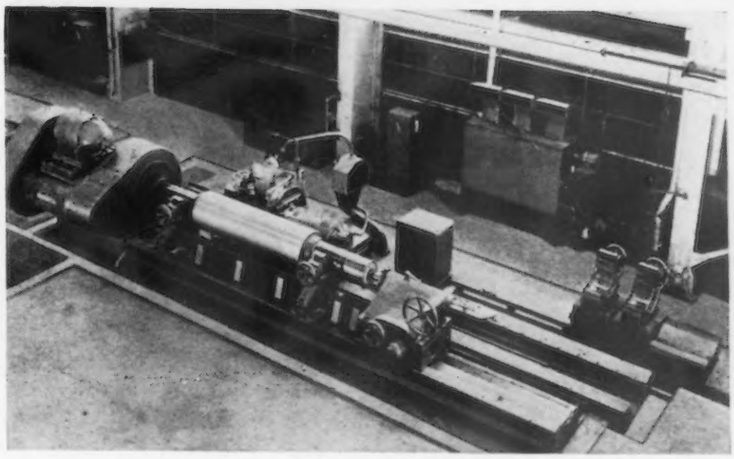


FIG. 3—A Mesta 60 in. x 24 ft heavy-duty grinder of the traveling table type.

Table I lists the types of wheels most generally used for grinding chilled iron or chilled alloy iron hot mill working rolls. These are not to be taken as hard-and-fast selections. Only tests will show which wheel will give the best results on a particular job, but reference to this table should reduce the number of wheels that need be tested.

Tests should be run on the machine which will be used with that wheel, for whether the machine is adapted to the job and maintained in good condition will determine to some extent whether a particular wheel will give the performance that might ordinarily be expected. Thus if the wheel spindle and bearings are of poor quality or poorly maintained, it is usually necessary to use a wheel of harder grade to avoid having the roll marked from chatter, burning or scoring.

Even the location of the machine in the shop has its effect. It may develop vibration from other machines in the department, which makes a harder wheel necessary to prevent chatter.

If hot mill rolls have been seriously injured by chipping, spalling, checking or cracking, it is necessary to grind away much more stock than would ordinarily be removed by the roughing operation. The grinding is done on the regular roll grinding machine with a wheel that can remove large amounts of material rapidly. These wheels are of coarser grit and harder grade than those used for ordinary rough roll grinding. They are listed in table I under snagging.

Often, in actual use, a wheel may not have the grinding action it had in tests. The most common trouble is that it acts too hard or too soft. There are a number of reasons for this. It may be necessary to use it on a machine other than the one on which the tests were run. The condition of a machine may have deteriorated. Even the skill or the "touch" of the operator may make it act different.

But most common is the general practice of using a compromise wheel. This is done because the rolls in a hot strip mill vary in hardness, the first, or scale-breaker, being the softest. They get harder and harder, with the last the hardest. Also, the first rolls can be of less perfect surface quality and finish, since most of the surface qualities of the strip are given by the later stands of rolls.

Fortunately, it is possible to manipulate grinding wheels within reasonable limits and so make them act either harder or softer than their real grade, and to change the surface quality and finish they produce. This is done by altering the ratio between wheel and work speed, by varying the rate of traverse and by changing the infeed.

The basic points to remember as to the effect of manipulating a wheel are these:

(1) To increase the wheel speed, within the limit of safety, while keeping the work speed the same, will make the wheel act harder, and vice versa.

(2) To increase the work speed relative to wheel speed will make the wheel act softer, and vice versa.

(3) To a comparatively slight extent, increasing the rate of traverse will make the wheel act softer, and vice versa. The chief effect of changing the traverse rate is on finish. The slower the traverse, the better the finish.

(4) Increasing the rate of infeed tends to make the wheel act softer.

In the second part of this article, to be published in a subsequent issue, the author discusses feeds and speeds, wheel dressing and balancing, coolants, and the steps to take to avoid inaccurate grinding and surface defects.—Ed.

TABLE I

Wheel Recommendations for Hot Mill Working Roll Grinding

Chilled Iron Working Rolls	
Rough and finish	
Strip and sheet	**C367-L75-B2**
Plate	**C241-J7-B1**
Neck grinding	**C367-L75-B2**
Snagging	**C16-Q5-B3**
Roll scouring bricks	**C80-M-V**
Steel, back-up rolls	**A24-L7-B1**

GAS from B furnace drying clay trough during blowing in of the relined furnace on Sept. 5.

Great Lakes Relines Blast Furnace in 44 Days

RELINING of a blast furnace in the record time of 44 days, with a result-gain in pig iron production of 45,000 tons, was achieved by Great Lakes Steel Corp., Detroit, in the relining of the company's B furnace on Zug Island. The unconventional means by which the furnace was relined in 44 days instead of the normal 90 days suggests methods by which the steel industry at large might increase production, according to George R. Fink, president of the corporation. The cost of relining the furnace was $600,000.

A brief ceremony, at which Mr. Fink was to relight the furnace, was planned for 10 a.m., Friday, Sept. 5. However, the furnace didn't wait. E. J. McCleary, blast furnace division superintendent, explained events leading up to the "self-starting" action as follows:

"At 6 p.m. Thursday, B furnace was filled with coke to the bottom of the tuyeres and 8000 lb of charcoal in bags was distributed around the 16 tuyeres. We then started to fill the furnace with ore, coke and limestone with the expectation that it would be full to 12 ft below the closed bell by 6 a.m. Friday, Sept. 5, at which time the mechanics and top supervisors were scheduled out. We intended to go inside the furnace on the coke and observe the bell and gage rod operations, and to measure the way the stock distributed in the furnace.

"However, at 11:30 p.m. on Thursday, when the furnace men were making up the iron runner, sparks came out of the iron notch through which a pipe had been installed to permit furnace gas to come out and dry up the clay trough after it had been lighted. By the time I arrived at the furnace, approximately 12:20 a.m., fire was showing at No. 5 tuyere. It was too well lighted to smother out with steam. We continued to fill the furnace and to check the gage rods from

the furnace top and at 5:00 a.m. the furnace was full to 9 ft, at which time the wind was put on the furnace.

"This premature lighting will not affect the furnace operations in any way. All it has done is to prevent us to get an actual measurement of how the stock fills. All equipment had been previously tested and operated and they functioned perfectly. We believe the carbon bottom retained enough heat and was hot enough to ignite the charcoal and the dry wood ties protecting the pipe thru the iron notch."

Saving of the 46 days was made possible, according to J. A. Clauss, vice-president in charge of engineering, through an unusual cleaning method by which iron was drained and washed out of the furnace, rather than permitted to solidify and removing by dynamite blast, and by employment of unusually large crews of workmen. An average of 200 men were on the job daily. Special ventilating equipment was installed for workers in the hearth, which has a diameter of 27 ft 3 in. and is 105 ft tall.

In accomplishing the record, carbon block crews laid 550,000 lb in 32 hr, a job normally requiring four days. Bricklayers laid 650,000 9-in. bricks in 11 days, compared with usual time of 18 days. Firms participating in the job were the Arthur G. McKee & Co., steelwork and rigging; A. E. Anderson Construction Corp.. brick and carbon block work, and Chicago Concrete Breaking Co., salamander drilling. On the basis of the furnace's daily production capacity, more than 45,000 tons of pig iron were gained by the 46 days saved in returning it to operation, according to the steel company's estimate.

How Great Lakes Relined B Furnace in 44 Days

Blast furnace B was built in 1941 in a record time of six months. It was blown in on Dec. 9, 1941. It has a rated daily capacity of 1250 tons. In May 1943, it produced a total of 49,704 tons, which was a new record for a furnace of its size at that time. It has a hearth diameter of 27 ft. 3 in.; bosh 30 ft. 3 in., and a height of 105 ft.

•

The furnace produced a total of 2,406,400 tons of iron during the five years and eight and a half months that it was in operation until it was blown out for relining on July 23, 1947.

•

Furnace was blown out on July 23rd at 10:45 a. m.

•

Salamander started to drain at 12:40 p. m. and stopped at 7:22 p. m.

•

Tonnage of iron in salamander was 480 tons.

•

Furnace was completely emptied of old brick by 10:00 p. m. on Aug. 11th.

•

Brick installed from bottom of furnace up to bottom of carbon by 11:00 a. m. on Aug. 14. First carbon block was set at 1:30 p. m. on Aug. 14.

•

The entire carbon bottom was installed in 32 hr.

•

Brick installed from top of carbon to top of furnace by Aug. 28. This work was accomplished in 13 days.

•

The bricklayers worked in two shifts of 10 hr each per day. An average of 14 bricklayers were employed on each shift, assisted by 34 laborers, 6 carpenters and 3 hoist engineers.

Miscellaneous steelwork on the furnace auxiliaries, including the replacement of gas mains, furnace bleeders, repairs to gas washer, stock house repairs, etc., required the employment of an average of 19 iron workers, assisted by 10 laborers, working two 10-hr shifts per day.

•

The large bell and hopper were placed in the furnace on Aug. 28, 38 days after blowout.

•

Brickwork repairs in the hot blast stoves included the replacement of one course of checkers in No. 1 stove, three courses of checkers in No. 2 stove, and four courses of checkers in No. 3 stove.

•

The stoves were heated by burning blast furnace gas from the other blast furnaces. This heating was started at 10:00 a. m. on Aug. 30.

•

Heated air was then applied to the furnace for drying out purposes by blowing a light blast through the stoves to the furnace, starting Sept. 1. This was continued with some interruption until Sept. 4.

•

Filling of the furnace was started on Sept. 4 and completed on Sept. 5.

•

The furnace lighted on Sept. 4 at 11:30 p. m., the 44th day after the blowout.

•

Some 650,000 9-in. equivalent brick were installed in the furnace on this relining.

•

The carbon block material installed in the furnace weghed 445,200 lb which, together with 84,800 lb of carbonaceous packing and cementing material installed with the block, made a total of 530,000 lb of carbon installed. On an average, about 200 men per day were employed on this job.

Detection of Isotopes

By Tracer Micrography

o o o

A NEW method for the more effective tracing of radioactive isotopes in materials in which they have been intentionally introduced has been developed by the National Bureau of Standards with the cooperation of the Dept. of Terrestrial Magnetism, Carnegie Institution of Washington. In this procedure, by means of a magnetic focusing arrangement, the radiation given off by a radio-isotope within a sample material is made to form an image of the emitting surface upon a photographic plate. The image may then be used in studying the distribution and concentration of the radioactive element present in the sample.

In many chemical and other fields of research, there is growing application of the method of tracers, in which the isotope of a given element is used as an indicator to tag or label certain groups of atoms so that they may be distinguished from other atoms of the same kind. Identification of tracer elements is at present greatly facilitated through the use of radioactive isotopes, which, because of recent developments in atomic energy, are now available in large quantities and are relatively easily detected through their radiations.

In the well-known method of radio autography a radio-isotope is introduced in a system, and the distribution of that particular element within the system is determined by bringing the sample in close contact with a photographic emulsion. This method lacks resolving power, because, even in case of perfect contact of the sample with the emulsion, the circle of confusion from every point of emission is so great that details less than 0.1 mm are very difficult or impossible to distinguish.

In order to improve the resolution of this tracer method, electron optical image formation has been utilized for determination of the distribution of a radioactive element within a given sample. This process, which may be called "tracer micrography," is based on the emission of high speed electrons (beta rays) by many tracer elements and the use of magnetic lens elements for forming an image on a suitable recording surface.

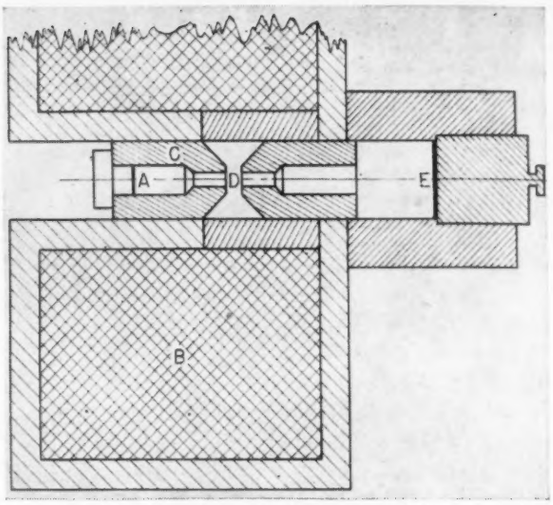


FIG. 1—Schematic diagram of the apparatus used for location of radioactive tracer elements within a sample material by the new method of "tracer micrography." The surface of the disk at (A) is covered with a substance containing radioactive isotopes. The magnetic coil (B) causes the soft-iron pole pieces (C) to produce an intense magnetic field at (D). Electrons emitted in nuclear disintegrations of radio-isotopes within the sample are brought to a focus by this magnetic lens upon a photographic film at (E).

In the absence of any means for correction of the chromatic aberration of electron optical lenses, the first micrographs were limited to those elements that emit electrons of uniform speed. Gallium chloride, prepared by chemical separation from zinc, was bombarded by heavy hydrogen nuclei in the cyclotron at the Carnegie Institution, and the solution was evaporated drop after drop on a ¼-in. tantalum disk. Radiation emitted from the surface of the disk, upon passing through a magnetic lens consisting of a small iron-clad coil with Armco iron pole pieces, was brought to a focus on a photographic film at a distance of about 3½ in., see fig. 1. An image of the tantalum disk, fig. 2, was thus obtained showing radioactive areas. The conditions were selected so that a linear magnification of two was produced.

For calibration of the instrument, the photographic film was replaced by a Geiger counter, and the lens current necessary to produce a maximum number of counts in unit time was determined for radiations of varying velocities. This established the focusing current for a given type of radiation.

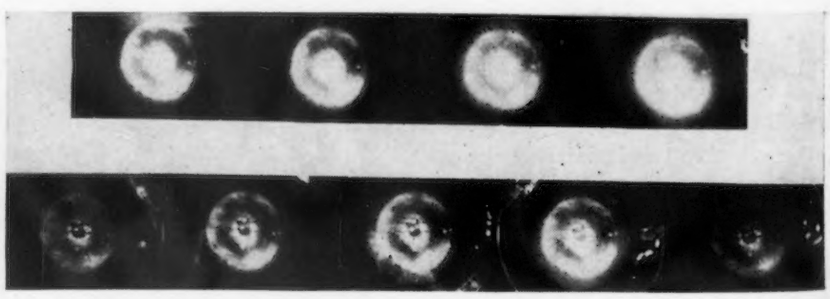


FIG. 2—Tracer micrographs showing the distribution of radioactive isotopes within a thin layer of sample material on the surface of a tantalum disk. These micrographs were obtained by an electron optical method called "tracer micrography," in which a magnetic lens is used to focus electrons emitted by the radio-isotopes upon a photographic film. Resulting patterns are thus images of surface of the disk showing radioactive areas. Improved resolution in lower row is due to reduction in size of aperture.

PRACTICAL ASPECTS OF

Bainitic Hardening of High-Speed Steel

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Laboratory and service cutting test data are presented in this concluding part of a two-part article to show typical improvements in tool performance resulting from the use of a new method of heat-treating high-speed steel, termed bainitic hardening. Some interesting observations are also introduced concerning the effects of primary bainite as isolated from secondary bainite, from the standpoint of continuous cutting and interrupted cutting efficiency.

SINCE the 50 to 60 pct bainite resulting from a transformation at 500°F did not affect the steel's ultimate hardness or its resistance to softening, it seemed desirable to determine whether more bainite could be introduced, so that any advantages which might result from heat treating to a bainitic structure could be realized to the greatest extent.

The 15 to 25 pct austenite remaining in high-speed steel quenched conventionally transforms to martensite while the steel cools from the tempering temperature. By causing alloy carbides to precipitate from austenite, the temper makes the austenite amenable to transformation,[14, 20] that is, conditions it.

On cooling from the tempering temperature, conditioned austenite behaves just like the original austenite did on cooling in the quench. It begins to transform to martensite and continues to do so as long as the cooling continues. It will even transform to bainite if the cooling is stopped at the right temperature, as Cohen discovered in the case of the austenite retained in 18-4-1 after a conventional quench.[21] The right temperature depends upon the previous austenitizing and conditioning treatments. For example, for an austenitizing at 2350°F and a conditioning at 1050°F for 2½ hr, the optimum holding temperature is 500°F.

The metallurgical aspects of bainitic hardening, as compared with conventional hardening practice, were indicated in part I (THE IRON AGE, *Sept.* 4, 1947) *and bainite formation data were presented based on four methods of testing. —Ed.*

Since the small amount of austenite retained on a conventional quench can be transformed to bainite, it seemed reasonable to expect that the larger quantities present after a holding at 500°F would also transform if suitably conditioned. This has been found to be the case. To distinguish it from the bainite formed from the original austenite and previously called primary bainite, the authors designate as *secondary bainite* that which forms from conditioned austenite.

Although it takes about 2 or 2½ hr at 1050°F to condition the austenite untransformed by a conventional quench,[14] it does not necessarily follow that this would be the best time to use for conditioning austenite stabilized by an initial holding at 500°F for primary bainite formation. Consequently, four dilatometric tests were made to establish optimum conditioning time.

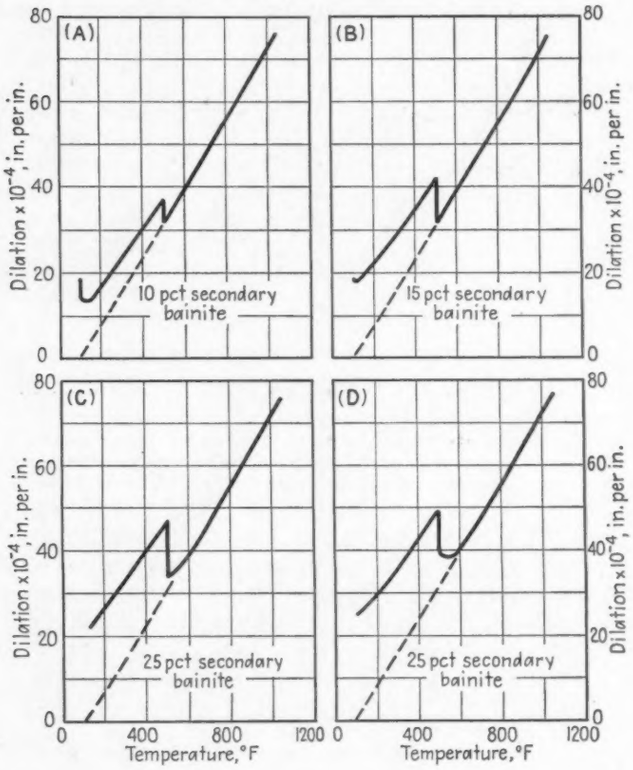
Separate samples which had been previously transformed at 500°F for 4 hr were conditioned

in the dilatometer at 1050°F for 1, 2, 4 and 8 hr. Then they were cooled to 500°F, held 4 hr, and the amount of secondary bainite formed in each sample was determined. These data, which are contained in fig. 5, showed that 1 and 2-hr periods are insufficient to yield the maximum amount of secondary bainite, but there is no need to extend the time beyond 4 hr which is about the optimum time for conditioning at 1050°F.

Other grades of high-speed steel are similar to 18-4-1 in their secondary bainite reactions. That is, the best treatment consists of a 4-hr conditioning at 1050°F, followed by an immediate 4-hr holding at 500°F.

[20] *J. P. Gill, R. S. Rose, G. A. Roberts, H. G. Johnstin, R. B. George; "Tool Steels" 1944, ASM, Cleveland.*
[21] *M. Cohen; U. S. Patent 2,265,973, Nov. 5, 1940.*

FIG. 5—Effect of conditioning time at 1050°F on the secondary bainite reaction in 18-4-1 high-speed steel. Rate of cooling approx 10°F per min; time at 500°F, 4 hr; time at room temperature, 16 hr. (A), (B), (C) and (D) represent steel conditioned at 1050°F for 1 hr, 2 hr, 4 hr and 8 hr respectively.



The secondary bainite reaction in 18-4-1 is illustrated by fig. 6. The sample used for this study was austenitized at 2350°F, quenched into salt at 500°F, held for 4 hr and cooled to room temperature. It was then placed in the dilatometer, heated to 1050°F for 4 hr for conditioning and cooled to 500°F in about 30 min, where it was held for 6 hr. Fig. 6 shows that the secondary bainite reaction proceeds in much the same way as the primary reaction. It starts quickly, some bainite forming while the steel cools to 500°F, but soon slows up and in about 4 hr stops, even though there is austenite still available for transformation. In 4 hr, about 30 pct bainite formed in this sample. All told, then the steel now contains about 80 pct bainite (including tempered bainite), since about 50 pct was formed during the initial period at 500°F. The balance of the structure consists of about 15 pct austenite and 5 pct residual carbide.

The amounts of primary and secondary bainite just mentioned were determined from length change measurements. It was also established by the specific volume data that, as shown in table V, about 50 pct primary bainite and 30 pct secondary bainite form in 18-4-1 during bainitic hardening. The authors have found that different heats of 18-4-1 do not deviate by more than about 5 pct from these figures.

The secondary bainite reaction just described, left about 15 pct austenite still untransformed. Though intended to convert all of this last austenite to bainite, another conditioning and holding treatment actually transformed no more than about half of it. Evidently, then, it is not feasible to convert all of the austenite of a high-speed steel to bainite even by several conditioning and transformation treatments. For this reason, only two isothermal transformation treatments are used in bainitic hardening. In the recommended procedure, mentioned in the first part of this article, the secondary bainite reaction is followed by a conventional double temper, which transforms the last austenite to tempered martensite.

Length Change Comparison

It is shown by fig. 7 which is discussed in Appendix II* that, during bainitic hardening, a total increase in length of about 0.0086 in. per in. results from the transformation of 85 pct of the austenite of 18-4-1 to tempered bainite and 15 pct to tempered martensite. Since Gordon, Cohen and Rose[12] have found that during conventional hardening the expansion which occurs when 18-4-1 high-speed steel is hardened and tempered is 0.0085 in. per in., it is indicated by the length change measurements that there is no difference in the size change which occurs when either method of hardening is used. Further evidence that this is the case is presented in table V in which it is shown that the specific volume, and therefore the density of completely transformed 18-4-1 is substantially the same, whether it has been hardened by the bainitic or the conventional method.

* *Appendix I, "Calculation of Constitution from Specific Volume Measurements," and Appendix II, "Calculation of Constitution from Length Change Measurements," are not included herein, but are available to readers upon request to* THE IRON AGE.

Recommended Heat Treatment For Bainitic Hardening

The preceding discussion set forth the changes that occur during each step of the bainitic hardening treatment (outlined in Part I). This treatment produces about 80 pct tempered bainite (primary and secondary) and 15 pct tempered martensite in 18-4-1 and most other types of high-speed steel. About 5 pct of the structure consists of residual carbides.

From tests, which will de described later, it was learned that primary bainite (plus tempered martensite) increases tool life in continuous cutting, whereas secondary bainite (plus tempered martensite) is best for a tool used in interrupted cutting. In other words, no single bainitic hardening cycle gives the best results in all machining operations. The procedure outlined above, which introduces both primary and secondary bainite, is the closest approach to an all-purpose treatment.

The earlier paper[1] suggested such bainitic hardening treatments without mentioning that they could be interrupted at the end of each holding period at 500°F. Now it is known that cooling to room temperature causes no structural change because the untransformed austenite has been stabilized. This means that bainitic hardening does not have to be done in a continuous operation.

Cooling to room temperature after holding at 500°F has advantages. Work treated in salt baths can be washed, a necessity if the conditioning is to be done in an air furnace. Cold straightening is easy after the initial 500°F transformation because the half-austenitic steel is relatively soft and ductile. And, of course, splitting the long bainitic hardening cycle into several parts facilitates heat-treating schedules.

Equipment Required for Bainitic Hardening

Bainitic hardening can be done in practically any shop equipped to heat-treat high-speed steels. In addition to the preheat and high heat furnaces all that is needed is a furnace which can be controlled at 500° and 1050°F. Bainitic hardening a tool with only one extra furnace might be done as follows:

(1) Preheat and austenitize in the usual manner.

(2) Quench into oil just long enough for the tool to lose its color, then transfer tool to the furnace operating at 500°F. (The purpose of the preliminary quench in oil is to cool the steel rapidly through the 2000° to 1400°F range in which dissolved carbide is precipitated. To attain maximum hardness and cutting efficiency, this precipitation must be avoided, insofar as it is possible, during either conventional or bainitic hardening.)

(3) Hold in the furnace for 4 hr after the tool reaches 500°F.

(4) Raise the furnace to 1050°F, holding for 4 hr after the piece reaches this temperature.

(5) Cool in the furnace from 1050° to 500°F, since no other furnace is available. Some bainite will form during the cooling, but the tool should be held at 500°F for 4 hr to assure that the maximum amount will be formed.

(6) Double temper in the conventional manner.

Bainitic hardening as described above takes more time than is actually required. If several furnaces or liquid baths are available, the work can be transferred directly from one to another and will reach the transformation and conditioning temperatures quickly. Salt or lead baths may be used, but salts must be selected with care. Work heated in a high temperature bath of barium chloride can be hot quenched into a cyanide bath at about 1100°F, but the cyanide-covered work cannot then be immersed in a 500°F nitrate bath, since cyanide and nitrates are dangerously reactive with each other. From the high heat bath, work should not be quenched directly into a 500°F nitrate bath because the nitrates decompose when overheated. Fixtures covered with cyanide or nitrates should not be returned to the preheat or high heat baths. A safe combination is: High heat—barium chloride; intermediate quench—oil or or a neutral (chloride) bath; 500°F transformation—nitrates or air furnace; conditioning and tempering—nitrates or air furnace. If an air furnace is used for conditioning, work should be washed free of low-temperature salt.

TABLE V

Specific Volume Data on Conventional and Bainitic Hardening of 18-4-1 High-Speed Steel

Treatment	Specific Volume cc per g	Constitution * B[1], Pct	A[1], Pct	M[1], Pct	C[1], Pct
BAINITIC HARDENING					
Austenitized 2350°F, cooled 500°F, held 4 hr, air cooled	0.11452	50	45	0	5
Reheated 1050°F 4 hr, cooled 500°F, held 4 hr, air cooled	0.11540	80	15	0	5
Tempered 1050°F, 2 hr, air cooled	0.11583	80	0	15	5
Tempered 1050°F, 2 hr, air cooled	0.11582	80	0	15	5
CONVENTIONAL HARDENING					
Austenitized 2350°F, oil quenched	0.11547	0	15	80	5
Tempered 1050°F, 2 + 2 hr.	0.11575	0	0	95	5

[1] B—Bainite and tempered bainite; A—Austenite; M—Martensite and tempered martensite; C—Residual carbides.
[1] B, A, and M calculated from specific volume, see Appendix I.*

Response to Bainitic Hardening

In discussing primary bainite, it was stated that most types of high-speed steel, except 20-4-1½ + 12 pct Co, reacted like 18-4-1. To determine how the other types responded to a complete bainitic hardening cycle, nine different high-speed steels (table VI) were put through the treatments described above. Hardness tests were made at each stage. Microscopic examinations of the structures showed the approximate quantities of primary and secondary bainite which had been formed. For comparison, other samples of the

TABLE VI

Analyses of Steels Investigated

Type	C	Mn	Si	Cr	V	W	Mo	Co
18-4-1	0.74	0.31	0.32	4.02	1.12	17.95	0.21	—
6½-5-4-2	0.84	0.22	0.27	4.08	2.03	6.15	4.93	—
1½-9-4-1	0.80	0.25	0.26	3.89	1.16	1.52	8.82	—
0-8-4-2	0.88	0.27	0.16	4.11	2.05	—	8.06	—
18-4-2	0.82	0.30	0.27	4.03	2.15	18.49	0.86	—
18-4-1+5 pct Co.	0.73	0.32	0.36	4.30	1.15	18.07	0.70	4.84
14-4-2+5 pct Co.	0.76	0.23	0.33	3.86	2.00	14.39	0.35	5.49
18-4-2+8 pct Co.	0.79	0.31	0.20	4.37	1.86	18.84	0.65	7.46
20-4-1½+12 pct Co.	0.79	0.26	0.21	4.36	1.67	19.93	0.71	11.91

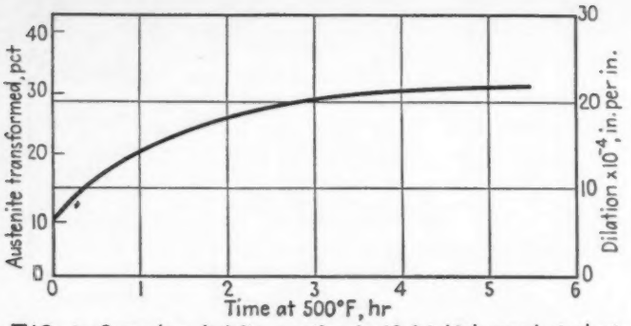


FIG. 6—Secondary bainite reaction in 18-4-1 high-speed steel at 500°F; conditioned at 1050°F, 4 hr; cooled to 500°F in 30 min. Dilation shown for zero time at 500°F occurred during cooling from 1050°F.

same steels were austenitized, oil quenched, and double tempered in the conventional manner.

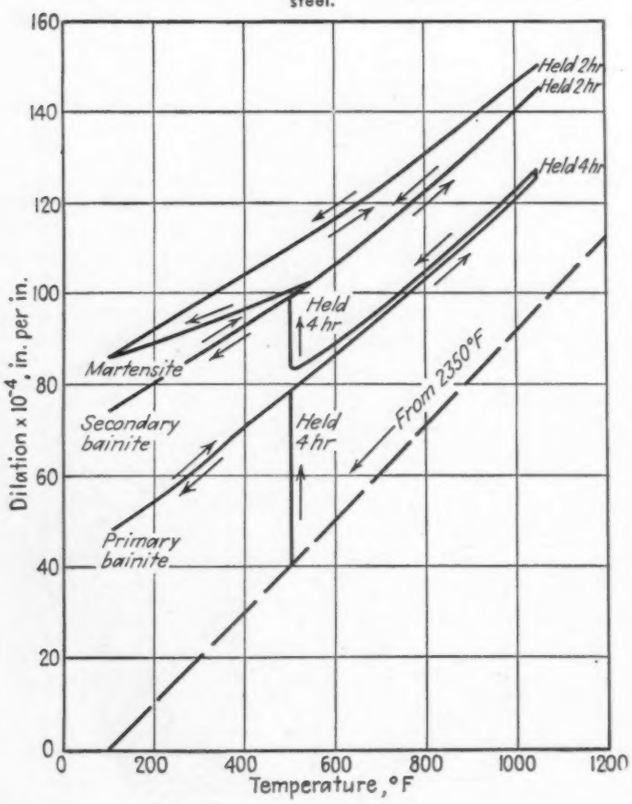
As shown in table VII, the hardness of high-speed steel is altered only slightly by the use of bainitic hardening instead of conventional hardening. Data relative to metallographic examinations have been omitted because there were not enough differences in the amounts of bainite formed in most of the steels to be significant. These examinations yield only reasonable approximations of the extent of a transformation, particularly when large amounts of the transformation product are present. It can be stated, however, that all but one of the steels contain 50 to 60 pct primary bainite after the initial transformation period and 20 to 30 pct secondary bainite after the conditioning and second transformation. The one exception is the 20-4-1½ + 12 pct Co type. Only a trace of primary bainite forms during a 4-hr holding at 500°F. After the conditioning treatment, another 4-hr period develops about 40 pct secondary bainite in this steel.

The reluctance of this 12 pct Co steel to respond to the ordinary bainitic hardening treatment was overcome after many experiments. The solution was to condition the austenite before even the primary bainite had formed, and to use 400°F instead of 500°F for the holding temperature. In this way, a considerable quantity of primary bainite, probably about 40 or 50 pct, will form during the initial holding period. Then a *second* conditioning plus another transformation yields (on the basis of metallographic examinations) about as much bainite as the standard treatment produces in the other steels.

The most effective holding temperature for this grade is 400°F because the primary bainite reaction, at best slower than in the other steels, in the unconditioned state, is most rapid at that temperature. This was illustrated by the TTT curve for this grade, fig. 2.

The next step was to determine whether a conditioning preceding the first transformation would speedup the primary bainite reaction in the other steels. The results were negative. Several other high-speed steels, which were much less sluggish in their primary bainite reactions than the 12 pct Co steel, were tested. They formed virtually no more bainite during the initial 4-hr transformation when their primary austenites had been conditioned. Apparently the austenite of a high-speed steel has to be extremely sluggish, either inherently as in the case of the 12 pct Co type, or as a result of its being stabilized at a temperature such as 500°F, in order for a conditioning treatment to increase the amount of bainite which can be formed.

FIG. 7—Composite dilation-temperature curve showing progress of transformation during bainitic hardening of 18-4-1 high-speed steel.



Continuous and Interrupted Cutting Tests

Since the foregoing tests disclosed that bainite does not adversely affect the hardness of high-speed steel, or its resistance to softening, it seemed logical to investigate the cutting efficiency of bainitic high-speed steels. For this purpose a test similar to that employed by the U. S. Navy Dept. was adopted. The procedure for making this test, which has been used for many years to evaluate cutting performance of high-speed steels, has been set forth elsewhere.[1]

The Navy type of breakdown test does not point up any measure of the toughness of a high-speed steel, but demonstrates only the performance of the steel in continuous cutting, in which a long tool life is predicated chiefly upon high red hardness. For example, a tool that has been quenched from an excessively high austenitizing temperature, thus rendering it relatively brittle, would nevertheless have high red hardness, and earn a good rating in the continuous cutting test.

In an attempt to compensate for this inadequacy, the continuous cutting test was supplemented by an interrupted cutting

TABLE VII

Response of Principal Grades of High-Speed Steel to Bainitic Hardening Treatment

Treatment	Rockwell "C" Hardness								
	18-4-1	6½-5-4-2	1½-9-4-1	0-8-4-2	18-4-2	18-4-1 + 5 pct Co	14-4-2 + 5 pct Co	18-4-2 + 8 pct Co	20-4-1½ + 12 pct Co
Conventional Hardening									
Oil quenched from austenitizing temperature	65.1	65.4	65.5	65.6	64.7	65.0	65.5	65.3	64.8
Tempered at 1050°F for 2 + 2 hr	65.0	64.9	64.7	64.2	64.5	64.8	65.5	64.9	65.1
Bainitic Hardening									
Austenitized, transformed 500°F, 4 hr, air cooled	57.8	57.2	54.6	56.0	56.8	57.9	57.0	59.2	62.2
Reheated 1050°F, 4 hr, transformed 500°F, 4 hr, air cooled	63.3	64.0	63.7	64.5	63.7	63.3	65.5	63.5	64.5
Tempered at 1050°F for 2 + 2 hr	64.4	64.0	64.4	63.7	63.4	64.0	65.5	64.3	65.0

Austenitizing temperatures used: 18-4-1, 2350°F; 6½-5-4-2, 2250°F; 1½-9-4-1 2225°F; 0-8-4-2 2225°F; 18-4-2 2350°F; 18-4-1 + 5 pct Co 2375°F; 14-4-2 + 5 pct Co 2350°F; 18-4-2 + 8 pct Co 2375°F; 20-4-1½ + 12 pct Co 2400°F.

test. The procedure used for both tests was the same, with two exceptions: (1) in the interrupted cutting test the test log was slotted along its entire length, the slot being 1 in. wide and about 4 in. deep, and (2) the cutting conditions were slightly altered because of the repeated shock imparted to the edge of the tool by the interrupted cut.

Two tests were made in an attempt to isolate the influence of primary bainite from that of secondary bainite, if any such differences existed. The first test was run with 5/16-in. square bits, and the second with 1 x ½-in. tools. In each size group were tools containing only tempered primary bainite (plus tempered martensite), only secondary bainite (plus tempered martensite), and only tempered martensite.

Table VIII summarizes the results of the tests. Apparently, primary bainite and secondary bainite exert different effects on the cutting efficiency of 18-4-1 + 5 pct Co. high-speed steel. Primary bainite improves the efficiency in continuous cutting, while secondary bainite does not, and primary bainite only slightly raises the interrupted cutting efficiency, which is however, significantly improved by secondary bainite. Primarily on account of variation in tool size, the results of the two tests do not evaluate the bainitic treaments to the same numerical degree. However, the direction of the differences is quite definite.

These findings at once suggested the desirability of combining the effects of primary and secondary bainite. A steel containing bainite that has formed from both the primary and the conditioned austenite might have improved efficiency in smooth and in interrupted cuts. Accordingly, Navy cutting tests were made on tools given some of the treatments previously outlined in table VII as applied to 18-4-1 and 5½-4-1½ types of high-speed steel, with and without 5 pct

TABLE VIII

Effect of Primary and Secondary Bainite on the Cutting Efficiency of 18-4-1 + 5 pct Co High-Speed Steel

Size	Tool	Heat Treatment[1]	Average Tool Life, Min	Cutting Efficiency, Pct	Improvement over Conventional, Pct
Continuous Cutting					
⅝ in. sq	1	Conventional	13.84 \ 13.94	100	0
	2	Conventional	14.03 /		
	3	Primary bainite	18.71 \ 18.16	130	+30
	4	Primary bainite	17.60 /		
	5	Secondary bainite	13.87 \ 13.90	99	−1
	6	Secondary bainite	13.93 /		
1 x ½ in.	1	Conventional	11.13	100	0
	2	Primary bainite	13.49	121	+21
	3	Secondary bainite	11.57	104	+4
Interrupted Cutting					
⅝ in. sq	7	Conventional	11.34	100	0
	8	Primary bainite	12.59	111	+11
	9	Secondary bainite	14.81	131	+31
1 x ½ in.	4	Conventional	7.19	100	0
	5	Primary bainite	9.81	136	+36
	6	Secondary bainite	16.48	229	+129

[1] Conventional—2350°F, oil to room temperature, 2 + 2 hr at 1050°F; primary bainite—2350°F, transform at 500°F for 6 hr, 2 + 2 hr at 1050°F; secondary bainite—2350°F, oil to room temperature, 2½ hr at 1050°F, transform at 500°F for 20 hr.

TABLE IX

Effect of Primary and Secondary Bainite on the Percent Cutting Efficiency of 18-4-1, 18-4-1 + 5 pct Co, 6½-5-4-2 and 5½-4½-4-2 + 5 Co

	18-4-1	18-4-1 + 5 Co	6½-5-4-2	5½-4½-4-2 + 5 Co
Continuous Cutting				
Conventional	100[1]	100[1]	100[1]	100[1]
Primary bainite	139	137	179	148
Secondary bainite	100	111	150	120
Primary and secondary bainite	130	113	258	148
Interrupted Cutting				
Conventional	100[1]	100[1]	100[1]	100[1]
Primary bainite	114	163	60	80
Secondary bainite	116	315	76	180
Primary and secondary bainite	113	175	92	132

[1] This does not mean that every high-speed steel, conventionally treated, had the same tool life in continuous cutting, or in interrupted cutting. Nor that a given steel had the same tool life in continuous as in interrupted cutting. To evaluate the effect of the special treatments on each steel, the tool performance of that steel, conventionally treated, operating under the particular cutting conditions, was arbitrarily rated as 100 pct.

1 x ½ in. tools, Navy type test cutting conditions.

Co. Regular 1 x ½-in. tools were run for six grinds each. Results of the tests are given in table IX.

For all treatments, 18-4-1 and 18-4-1 + 5 pct Co were austenitized at 2350°F for 1½ min; 6½-5-4-2 and 5½-4½-4-2 + 5 Co at 2225°F for 1½ min. The treatments following the austenitizing were:

Conventional—Oil quench to room temperature; temper at 1050°F for 2 + 2 hr.

Primary bainite—Quench into bath at 460°F and hold for 7 hr; temper at 1050°F for 4 + 2 hr.

TABLE X

Results of Commercial Machining with Bainitic Tools

Job	Conditions	Bainitic Production
Cutting 1⅜ in. studs of Cr-Mo stud steel with ½ in. tools	220 rpm 0.004 in. per rev	8 times more pieces per grind
Boring ID of forged SAE 1050 chuck body—16 in. OD x 8 in. long x 4 in. ID —with ⅝ in. tools	—	One Stellite and two high-speed tools burned out in 2 in. Bainitic tool finished cut and did 6 other forgings
Rough turning high-speed bar-stock on Brightman machine with 1½ x ¾ in. tools	37 rpm (head) 0.160 in. per rev	2 to 3 times more bars per grind
Turning heat-treated crankshaft faces with $\frac{3}{16}$ in. interrupted cut	—	10 to 15 more cranks per grind
Screw machine work. ⅜ in. and ½ in. tools	—	3 times more pieces per grind
Threading shafts of heat-treated 4140	—	2½ to 4 times more pieces per grind
Machining 4340 gear blanks with ¾ in. square bits	226 rpm 0.006 in. per rev	1½ times more pieces per grind
Roughing and finishing semi-annealed 0.45 carbon forgings	—	3 to 4 times more forgings per grind
Turning ½ in. cold-drawn 8630 shafting with $\frac{1}{16}$ in. bits	875 rpm 0.003 in. per rev	1½ times more pieces per grind

Secondary bainite—Oil quench to room temperature; temper at 1050°F for 4 hr; cool to 460°F and hold for 7 hr; cool in air to room temperature.

Primary and secondary bainite—For tungsten steels: Quench into bath at 460°F and hold for 7 hr; temper at 1050°F for 6 hr; cool to 460°F and hold for 6 hr; cool in air to room temperature. For tungsten-molybdenum steels: Quench into bath at 460°F and hold for 7 hr; temper at 1050°F for 6 hr; cool to 460°F and hold for 6 hr; retemper at 1050°F for 2 hr; cool to 460°F and hold for 4 hr; cool in air to room temperature.

From the data in table IX it may be definitely concluded that, under the test conditions employed, primary bainite raises the continuous cutting efficiency, and secondary bainite the interrupted cutting efficiency, of 18-4-1 + 5 pct Co. The latter constituent does not affect the continuous cutting efficiency, although the former constituent somewhat raises the interrupted cutting efficiency. The same effects are produced in 18-4-1, but only with respect to continuous cutting efficiency—none of the treatments appeared to raise materially the interrupted cutting efficiency of 18-4-1. It is interesting to note that the tungsten-molybdenum and the tungsten-molybdenum cobalt steels respond to improvements in continuous cutting efficiency, through heat treatment, to a greater degree than do the tungsten steels.

The combination of primary and secondary bainite in the same steel is at least as effective in imparting increased efficiency in continuous cutting as is either constituents separately, except in the case of 18-4-1 + 5 pct Co.

As a rule, laboratory cutting tests should be viewed with reservation, because being closely controlled for the sake of reproducibility, they are restricted in scope. Consequently, the cutting tests just described were supplemented by service tests. Every effort was made to keep these tests objective. It was not intended to select applications with machining conditions favorable to improvement—they were ordinary, commercial jobs.

Detailed accounts of these tests need not be set forth here. A brief description of the jobs and the results obtained are listed in table X. Several of the jobs unavoidably involved a variable other than heat treatment—namely, composition. Unfortunately, single-point tools of one kind or another were involved in most of the reported trials. This was not by design. Other types of tools such as taps, drills, power saws, etc., were tested, but performance reports were vague. Accounts like "longer tool life," "holds an edge better" are not as enlightening as actual production figures; nevertheless, the data which were obtained seem to emphasize the superiority of bainitic tools to an even greater degree than did the severe conditions of the Navy-type test.

Acknowledgment

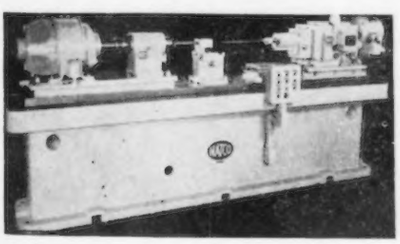
The authors acknowledge the assistance of P. Payson, A. Allten, and other colleagues at the Eastern Research Laboratory and at the Sanderson Laboratory in the preparation of this article.

New Equipment . . .

An improved deep hole driller, a die assembling and tryout machine, a straddle facing machine, vertical and surface broaches, spot welders, an electric heat-treating furnace and a tool feed drive are featured this week. Also shown are 3-phase motors, a pneumatic chip gun, vibration controls, a corrosion inhibiter and several other new or improved items.

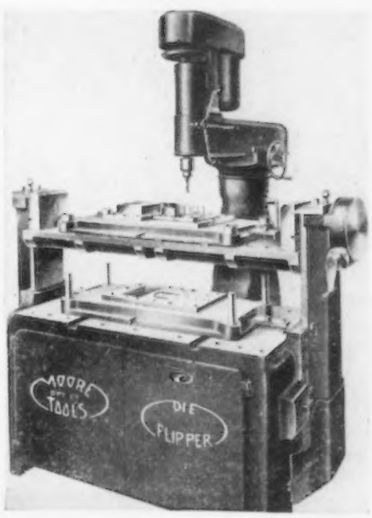
Deep Hole Driller

A HORIZONTAL deep hole driller so constructed that standard two lip twist drills or single lip gun drills can be used, has been announced by the *National Automatic Tool Co., Inc.*, Richmond, Ind. Deep oil passage and lightening holes not requiring accuracy of run-out or smooth finish are drilled with standard two lip twist drills at conventional speeds and feeds. Both the drill and the work is revolved, and a step feed cycle is used. Deep holes requiring smooth finish and minimum run-out are drilled with single lip gun drills at speeds higher and feeds lower than conventional for twist drills, it is said. In this case, only the work is revolved and a continuous feed is used. Deep holes requiring a reaming operation are reamed with a standard reamer. Only the reamer is revolved and a continuous feed employed. The right hand head is a standard Natco E9 holeunit equipped with a quick speed change gear driven drill spindle, and hydraulic feed arranged for either step drilling or continuous drilling cycles. The left hand head is a work spindle head which is either locked stationary or revolved. A master control station provides centralized operator control.



Die-Assembling Machine

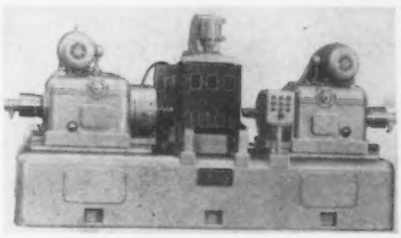
DEVELOPMENT of the Die Flipper by the *Moore Special Tool Co., Inc.*, Bridgeport, Conn., is said to have mechanized the process of trying out and assembling dies. It is said one diemaker without physical effort can perform all the operations of die-assembling —take apart, turn over, drill, tap and try out. One man operating the Die Flipper can test alignment, drill punches in place, tap for screw holes, hand stone and make visual inspection. The punch holder and die shoe are always clamped securely to the machine. The machine



will take apart and flip over a die set 20 x 40 in., with 12 in. shut height, pins engaged in bushings 4 in. It is so designed that the platen will hold the punch holder parallel to the die shoe under either compression or tension at all times. Another function of the machine is that of a radial drill on angular as well as straight holes. It offers speeds of 200 to 1200 rpm and drills holes up to 1½ in.

Straddle Facing Machine

A MACHINE tool for facing main bearings on diesel engine cylinder blocks has been developed by the *Cross Co.*, Detroit 7, which utilizes carbide-tipped tool bits of which two are mounted in each tool holder. In operation, the heads rapidly advance into cutting position; then the revolving bars carrying the tools feed out at 0.012 in. per revolution for the roughing cut, and feed back again at 0.006 in.

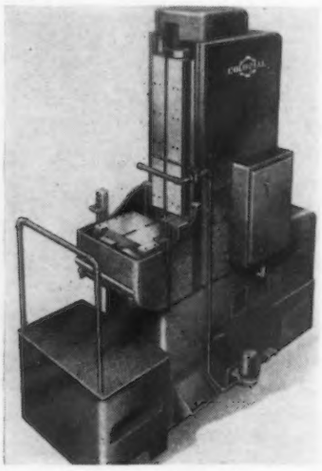


per revolution for finishing. Parts are located and clamped by power, then machined automatically. The operator simply presses the control buttons. The method is said to produce a superior finish; also to insure parallel faces, square to the main bearing bores. Production is 41 cylinder blocks net hourly.

Broaching Machines

ANNOUNCEMENT of an improved line of broaching machines which includes both pull-up and pull-down as well as single ram surface broaching machines, has been made by the *Colonial Broach Co.*, Detroit 13. All machines are of the vertical type and are offered in a complete range of standard tonnages and strokes. Outstanding features include a new hydraulic system layout; pumps are mounted outside of the machine housing and provided with a lightweight enclosure. A new air circulation system for the motors and hydraulic system provides maximum cooling. Hydraulic controls are group mounted in a single cabinet and electric controls are mounted on a single panel. Increased output per hour has been secured on the new Colonials it is said by making provisions for increased return speeds

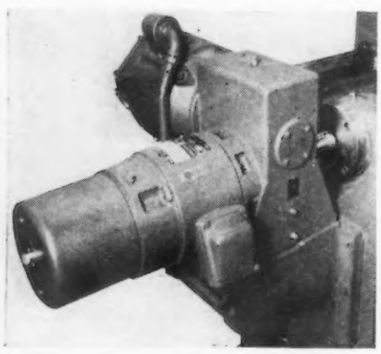
for the rams. In line with the increased performance of the new machines, columns have been



strengthened. The machine illustrated is the single-ram type surface broaching machine.

Machine Tool Feed Drive

COMPOSED of an ac traverse motor and a dc feed motor packaged into one unit, a feed-traverse drive for machine tools designed to produce a wide range of stepless feed and traverse speeds with close speed control has been marketed by *General Electric Co.*, Schenectady 5. Both motors in the unit drive into a differential gear which has a single output shaft. The gear output shaft is described



as so constructed that in many cases it can be coupled directly to the lead screw of the machine. Individual mounting of parts is not necessary as component parts are assembled as a unit. To install, the gear end of the unit is mounted on the machine to be driven. The unit may be inspected and oiled without removal. Feed speed ranges of 20:1 or greater can be provided.

Engine-Driven Welder

THE Ranger, a Flexarc lightweight engine-driven welder developed by *Westinghouse Electric Corp.*, 306 4th Ave., Pittsburgh 30, for operation anywhere a jeep can tow it, is designed for 200 amp at 30 v on the basis of 50 pct duty cycle. Design characteristics of the generator are said to provide for easy striking and maintenance of the arc for shop quality welding on steel, cast iron, alloys, hard surfacing aluminum and brass. The generator is direct-connected to a Hercules IXB engine. Welding current is adjusted over a range from 30 amp at 20 v to 250 amp at 30 v

in four major steps by plugging screw locking plugs on work and electrode leads. Intermediate values of current are obtained by rheostat control. Polarity is positively controlled by interchanging work or electrode lead connections. This unit is available either as a portable or stationary model.

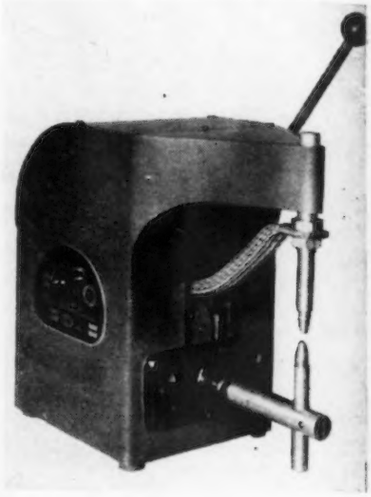
Hard-Surfacing Electrode

FOR hard-surfacing applications where resistance to impact, wear and abrasion is required, a new electrode has been announced by the Electric Welding Div., *General Electric Co.*, Schenectady. Designated type W-94, the electrode will work harden to over 50 Rc and operates on ac or dc reverse polarity. It is available in 14-in. lengths, with diameters of ¼, 3/16, 5/32 and ⅛ in. It is packaged in 50-lb standard packages.

Spot Welder

REX JUNIOR, a 1 kva spot welder, has been added to the line of welding equipment manufactured by *Rex Welder & Engineering Co.*, Kansas City. Welder is said to be ready for work after plugging into standard 110 v ac current outlet. Features listed are an air-cooled transformer, removable

standard No. 1 Morse taper pins and ability to weld up to 24-gage mild steel. Operation is controlled



by a hand lever on the right side, and a foot operated attachment is also available. The welder is said to be particularly suited for sheet metal shops and light manufacturing. The unit is 14 in. high and weighs approximately 75 lb. Throat depth is 6 in. and the lower horn is adjustable.

Water Saver

FOR turning on or shutting off the cooling water in a welding operation, *Weltronic Co.*, 19466 W. Eight Mile Rd., Detroit 13, has introduced the water saver for use with any type welding machine. The unit is so designed that its two

control relays and the solenoid operated water valve are de-energized if the welding machine is stopped for a period of time longer than 30, 60 or 90 sec. De-energizing the water valve stops the flow of cooling water; starting the welding machine energizes the water saver's initiating transformer, which is connected to the air solenoid valve coil on the welding machine.

Heat Treating Furnace

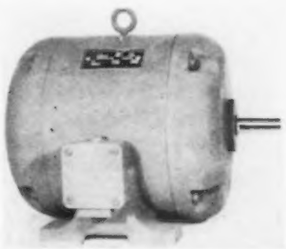
DESIGNED for continuous operation at 2000°F with temperature control provided down to 300°F, the Model VK-5 electric furnace marketed by *Cooley Electric Mfg. Corp.*, Indianapolis, is suitable for heat treating of small parts, tools and dies. The furnace heats from cold to 2000°F in 1½ hr, according to the manufacturer, and half this time is required after overnight shut-down. The chamber is 8x6x14 in. and contains six embedded-type heating elements, including one in the door. Power capacity is 4650 w and 2½ kw are required to maintain maximum operating temperature. The furnace draws 20.2 amp at 230 v. This unit is equipped with a selective power modifier, which, used in combination with an indicating-pyrometer, is said to permit meeting critical temperature requirements. It is claimed that power input may be adjusted to balance heat loss and to prevent destructive temperatures.

Die Handling Unit

THE Service Liftable, product of *Service Caster & Truck Corp.*, Albion, Mich., which has recently been announced, has been designed to simplify die handling. The unit is said to work in three ways; take dies from storage shelf, roll them across to the press, and lift them to exact press level. It may also be used as a work bench, truck and general lifter. Capacity is 2000 lb. Lowered, the top is 28 in. from the floor and raised it is 42 in. high. The unit is of all-welded construction with chain and screw lifting mechanism. Table top is 3/16-in. steel plate turned down 2 in. over an angle steel frame and measures 26x43 in. The unit is available with rubber, plastic or metal wheels.

Three-Phase Motors

TOTALLY enclosed 3-phase motors in sizes of 1½, 2 and 3 hp have been placed on the market by *Kato Engineering Co.*, Mankato, Minn. Rolled sheet copper bars are used in the squirrel cage rotor for low internal rotor resistance. The rotor is equipped with grease-sealed cartridge type bearings. Stator windings are submerged in varnish and each winding is baked twice. A special cast iron outlet box threaded for conduit is mounted on the side. Frame and endbells are cast iron with lifting ring. Motor is rated as follows: Amps 2.6, 440 v, 67 pct power factor, 6.9 ft lb, 60 cycles, 1160 rpm.



Pneumatic Chip Gun

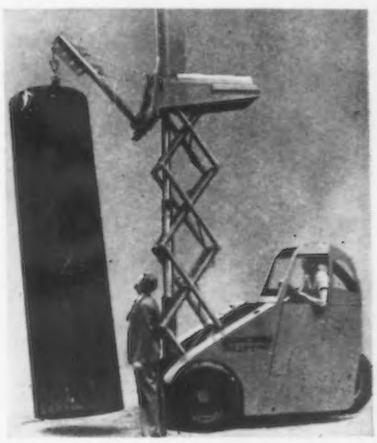
ANNOUNCEMENT of a pneumatic chip gun which cleans cuttings from drilled or tapped holes by placing the nozzle end of the gun over the hole and releasing air by thumb pressure has been made by *Buffalo Machinery Co., Inc.*, 833 Grant St., Buffalo 13. Cuttings are deposited in the body of the gun, to be emptied later, while the clean air escapes at low pressure. In operation, the air strikes the bottom of the hole and rebounds, carrying the cuttings upward into the body of the gun. As the air expands and loses velocity, it strikes baffles and drops heavy particles of metal into the body of the gun. It is said to clean at very light pressure.

Fork Truck Accessory

AN accessory known as the Side Shifter, which is said to permit the operator to pick up or deposit a unit load in an exact location without repositioning the truck, has been developed by *Towmotor Corp.*, Cleveland 10. Lateral movement of a load is provided, on forks or pallet, to either side. Through elimination of truck maneuvering in operations where loads must be positioned exactly, this device is claimed to assure maximum use of available storage area. The shifter is hydraulically operated through a double-acting cylinder controlled by a lever. The device is said to move the carriage face and forks a distance of 3½ in. in either direction.

Lift Truck

A HEAVY duty lift truck embodying a hydraulic lift that will handle 6000 lb to a height of 8 ft or 4000 lb to 11 ft has been announced by the *Mixermobile Manufacturers'*, Portland, Ore. The lift collapses completely into the truck body so that in lowered position there is no track or front obstruction to prevent the Wagnermobile lift, as it is called, from passing under low head clearance. With fork and boom the lift truck weighs 7425 lb. Quick-change attachments are available making possible the handling of a wide variety of heavy or bulky materials.



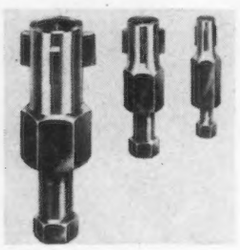
Reverse Current Plating

A PROCESS for electroplating which is said to reduce polishing costs as well as to provide an electrodeposit of great smoothness, increased density and decreased porosity is announced by the *Hanson-Van Winkle-Munning Co.*, Matawan, N. J. The new process is an engineering development of the Westinghouse Electric Corp. and involves a periodic reverse plating

cycle in which the plating current is reversed briefly at short periodic intervals. Better plate distribution and thicker than normal deposits are obtained at higher current densities than are generally used, it is claimed. In commercial practice, it has been shown that a 20-4 sec cycle, as well as cycles intermediate between this and a 5-1 sec cycle are satisfactory. Equipment available consists of an electronic time-contactor unit capable of handling up to 50 amp with a range of a fraction of a second to 25 sec for each portion of the time cycle.

Internal Pipe Wrench

CLAIMED to have sufficient strength to strip a thread without losing its grip, the B & D internal wrench is now being offered for universal maintenance work by *Porst Sales*, 132 W. Union St., Pasadena 1, Calif. It consists of a screw-type mandrel that forces outward three gripping dogs until



they bite into the inside of the pipe. The pipe or nipple is turned loose with application of a standard wrench. Gripping dogs are made of hardened tool steel and body is steel alloy. The wrench is available in eight sizes ranging from ½ to 6 in. Special long body 5¾-in. wrenches are also available in ½, ¾, and 1-in. sizes.

Corrosion Inhibiter

MORPHOLINE, a volatile compound that inhibits corrosion due to carbon dioxide in steam and condensate-return lines of steam heating or processing systems is available again, *Carbide & Carbon Chemicals Corp.*, 30 E. 42nd St., New York 17, has announced. It is suggested for the treatment of feedwater for boilers supplying low or medium-pressure steam to heating or processing systems with extensive piping or condensing surfaces. Morpholine, an organic chemical alkali, is said to control the acidity due to free carbon dioxide in feedwater or carbon dioxide resulting from the decomposition of soluble carbonates. The compound evaporates with water in definite proportions and only small amounts of the chemical are required to inhibit corrosion effectively, it is claimed.

High-Pressure Lubricator

A HIGH-PRESSURE lubricator developed for positive lubrication of industrial machinery and automotive vehicles has been released by *Industrial Machine & Supply Co.*, Empire Bldg., Pittsburgh 22. Known as the SL-104 High Pressure Chassis Lubricator, it is equipped with an air operated double-acting pump which is said to build up a 50 to 1 pressure ratio for faster lubrication. Pumping of grease on both up and down strokes is said to result in constant grease flow and lack of air pockets in the line. Booster control valve is said not to be necessary. The lubricator is designed for use with 400, 100 and 25-lb refinery drums.

Oil Additive

ANNOUNCEMENT has been made by the *Alox Corp.*, 3933 Buffalo Ave., Niagara Falls, N. Y., of a universal oil additive developed to improve the lubricity of all types of lubricating oils and to increase their life under high temperatures and pressures. This compound is Alox 162 and the manufacturer states that it provides the necessary wetting characteristics which make it possible for the oil to completely coat the bearing surface with a closely bonded, continuous film to prevent corrosion. In the gear lubrication field the compound is said to reduce temperatures and answer the need of pressure lubrication. Bearing wear and scuffing and scoring of pistons in diesel engines is also said to be reduced.

Silica Coating

SILCOTE, a new material developed to produce improved protective coats of silica on front surface mirrors by low-temperature, low-pressure application, has been introduced by *National Research Corp.*, 70 Memorial Drive, Cambridge 42, Mass. Front surface mirrors coated with this material are said to have a resistance to abrasion more than 1600 times that of an unprotected mirror. The coating is applied by high-vacuum evaporation from a tungsten, molybdenum, or tantalum boat at 2730°F. Subsequent heat treating in air is necessary to harden the protective coat. Maximum protection is said to be obtained by heat treating in air for 18 hr at 570°F. There is claimed to be no measurable difference between coated and uncoated surfaces. The material may be briquetted to form standard pellets.

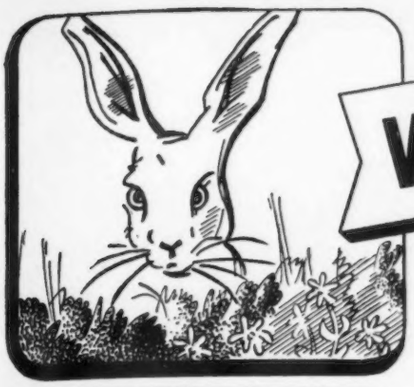
Vibration Control Unit

TYPE RS conical rubber spring mounting, vibration control unit for compressor units, generator sets, motor generators, pumps, motors, fans and other equipment, has been announced by the *Korfund Co.*, 48-35 32nd Place, Long Island City 1, N. Y. Load capacity ranges from

25 to 125 lb per unit and conical spring design is said to provide greater horizontal stability than all-rubber mountings. The combined use of rubber and steel springs is also claimed to increase the load capacity and give the mounting a wide frequency range equally effective for pumps operating at 1750 rpm as well as compressors running 450 rpm.

Fire Fighting Compound

CALLED Penetrate, a product announced by *American-La-France-Foamite Corp.*, Elmira, N. Y., is described as giving ordinary water greater penetrating and spreading qualities when 1 pct of the product is added. This product is compounded of chemical ingredients, and mixed with water it is said to get to deep-seated fires as the mixture does not have surface tension and spreads rapidly. Penetrate is claimed to be no more injurious to metals or wood than water itself and to have less corrosive effect than water.



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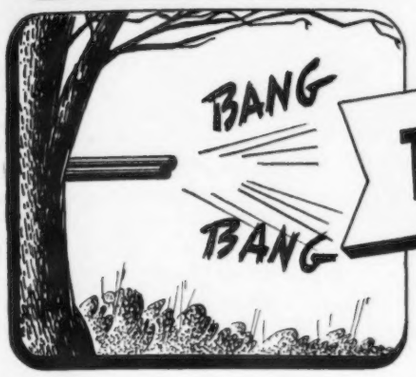

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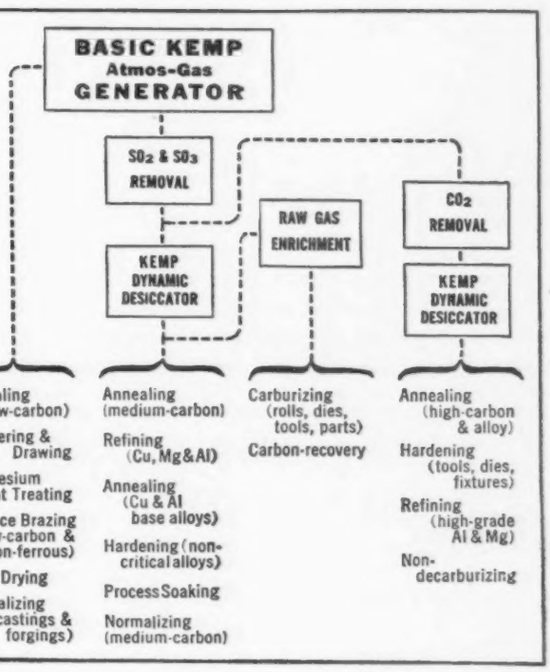

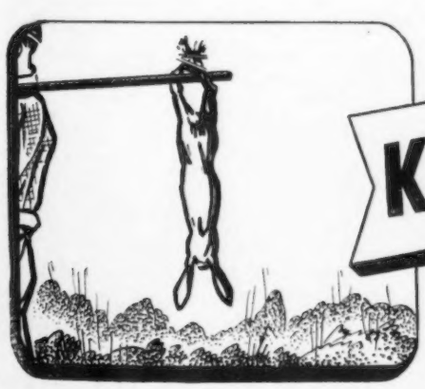

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WALTER G. PATTON

• Auto industry hopes to produce 4,500,000 units this year . . . Plans for introducing new Ford line of cars revealed . . . Proposed pension plan for auto workers overwhelmingly beaten.

DETROIT—According to *Automotive News*, the automobile industry produced 3,086,714 cars and trucks in the U. S. from Jan. 1 to Aug. 30, 1947. (With the Canadian output added the vehicle total comes to 3,252,650.)

In the 17 weeks of production remaining in 1947 the industry will have to average about 83,000 per week to turn out 4,500,000 vehicles this year.

During the week ended Aug. 30, most plants with the exception of Chevrolet and Pontiac were operating close to normal and 80,300 vehicles were assembled. Output for the current week is expected to reach 102,000 units in U. S. plants, close to the 1947 peak.

Assuming the recent railroad tie-up in Pittsburgh, the potentially dangerous Carter Carburetor strike plus unforeseeable interruptions in the transportation system of the country does not cut too deeply into automobile output, the industry appeared this week to have a good chance to reach 4,500,000 units in 1947. This is about 10 pct under the original goal of 5 million set for 1947.

If the 4.5 million mark is reached, it will be the industry's fourth largest year, exceeded only by 1929, 1937 and 1941. Top year for the auto industry's U. S. plants is still 1929 when 5,358,420 vehicles were assembled. The 1941 total was 4,649,622.

It is anybody's guess as to when the effects of the extensive Pittsburgh steel mill shutdowns will be reflected in automobile production. While a casual observation might indicate that General Motors (which is one of Carnegie-Illinois' largest customers in this area) would be hardest hit, the fact that GM has recently been shut down for inventory may cushion the blow somewhat. Past experience has shown, however, that it is usually the auto company's vendors that are hardest hit by a road block in the steel flow.

No one was willing to say whether or not the suppliers of GM, Ford or Chrysler are most vulernable to the effects of recent Pittsburgh steel plant shutdowns. Meanwhile, the Carter Carburetor strike has reached a point where Chrysler is reported to be shipping new cars without carburetors. A company spokesman denied reports that Chrysler would be closed this month because of a steel shortage.

The veil of secrecy that has been draped over Ford's plans for its 1948 model was officially lifted a little higher this week. While little new information was available J. R. Davis, vice-president and director of sales, did confirm a number of rumors which have been circulating rather widely in Detroit during recent months.

Davis confirmed reports frequently heard here that the new Lincoln and Mercury will make their debut by next spring. The new Ford V-8 is expected to follow several months later. Davis also indicated that the actual date of introduction may be sufficiently retarded to warrant calling the new car a 1949 rather than a 1948 model.

THE much discussed automatic transmission Ford is working on will not be introduced when the new Ford makes it debut, Davis said. The new transmission is expected to come along several months later, he indicated.

Most sources here believe that all car makers will provide automatic transmission as at present as an extra cost item. A possible exception might be the highest priced cars.

Davis also disclosed that the introduction date on the new Ford models has already been set back seven times. He denied reports that Ford will abandon its V-8 engine. The company plans to retain its V-8 and will also continue its six-cylinder in-line engine. Both power plants are expected to be changed significantly.

Davis indicated that pilot models of the completed cars and component parts are currently going through a series of exhaustive tests on Ford's proving grounds.

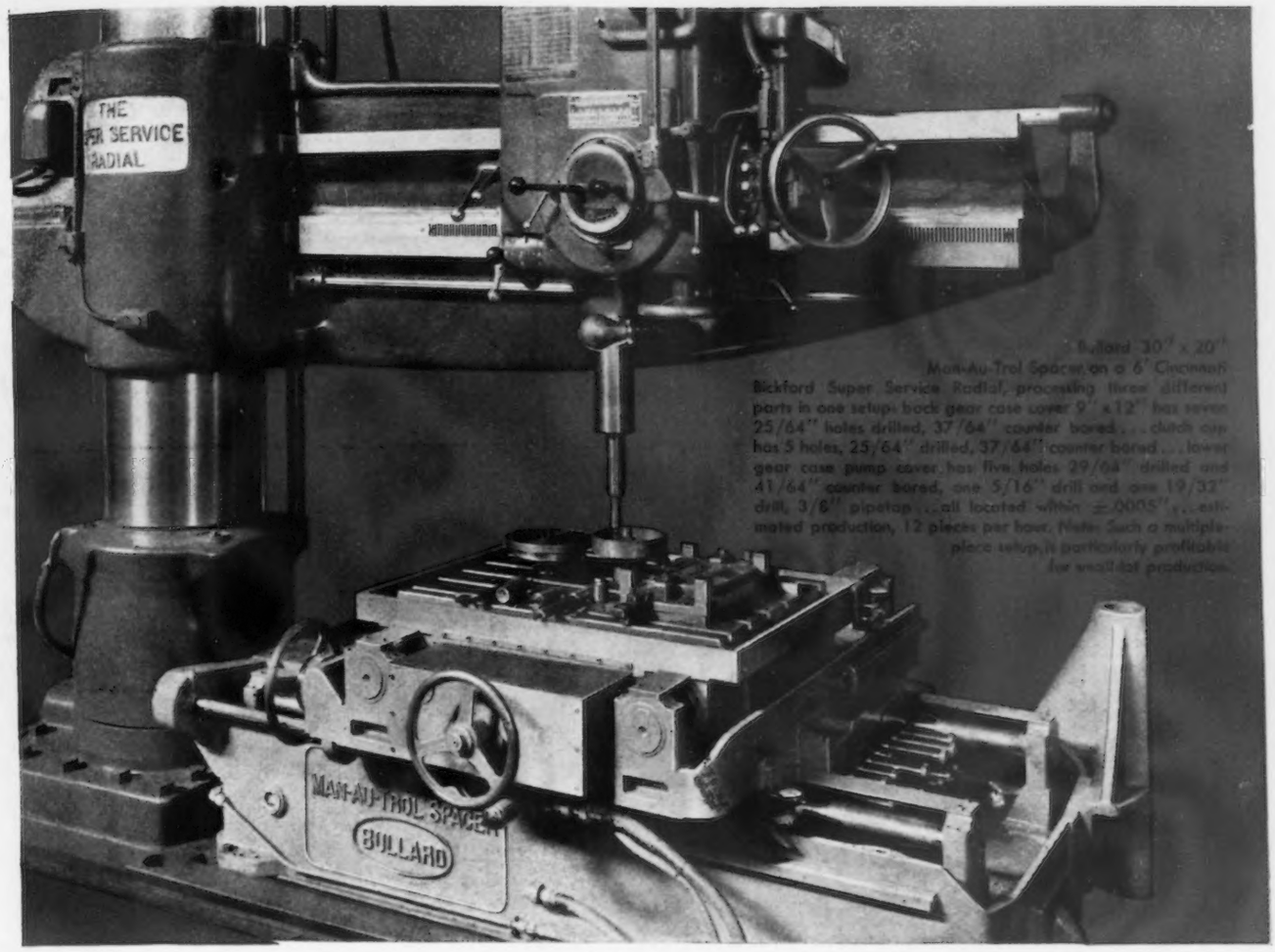
The new Ford has been produced under the direction of Harold Youngren, Ford engineering chief; George Walker, nationally-known industrial designer, and John Oswald, executive engineer of styling and body engineering.

Davis gave no hint as to the possible price of the new car which he said would be established at the time the new model is introduced. Because of the extensive changes that will be incorporated in the new car, Davis said a plant shutdown of from 3 to 6 weeks will be required to get the new model into production.

As predicted in THE IRON AGE (Aug. 28, p. 86), the Ford pension plan is being voted down. In a recent election at Ford's Buffalo assembly plant, the pension plan was rejected by a vote of almost 10 to 1.

Present indications are that the pension proposal has been overwhelmingly defeated at Ford's Highland Park plant. While the voting is not yet complete, election board members indicated that the vote would be at least 12 to 1 against the pension plan. About 7000 members out of 10,000 cast ballots in the election.

The major test for the plan will come this weekend when 65,000 eligible voters in Ford Local 600 cast their ballots. A mass meeting of Ford workers has been called for Sept. 14 to hear union attorneys discuss the Ford pension proposal. At the mass meeting the



Bullard 30" x 20" Man-Au-Trol Spacer on a 6' Cincinnati Bickford Super Service Radial, processing three different parts in one setup: back gear case cover 9" x 12" has seven 25/64" holes drilled, 37/64" counter bored . . . clutch cap has 5 holes, 25/64" drilled, 37/64" counter bored . . . lower gear case pump cover has five holes 29/64" drilled and 41/64" counter bored, one 5/16" drill and one 19/32" drill, 3/8" pipetap . . . all located within ±.0005" . . . estimated production, 12 pieces per hour. Note: Such a multiple-piece setup is particularly profitable for small-lot production.

NEW BULLARD MAN-AU-TROL SPACER

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The BULLARD MAN-AU-TROL SPACER now on the production line is more than living up to its advance notices. Machines and men formerly tied up on the non-productive work of making hole-locating jigs are now doing the kind of productive work that cuts operating overhead, develops competitive price advantages and steps up profit. Drilling, boring, reaming and tapping volume and accuracy are reaching new peaks . . . while operators' fatigue is measurably reduced.

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members will vote whether to accept the pension plan and a 7¢-an-hour general raise or a 15¢ raise.

UNION left-wingers who belabored Ford for years because a pension plan was not provided are now reported to have objected on the grounds that the plan is "too paternalistic." Even Thomas Thompson, president of UAW-CIO Ford Local 600 and long identified with the left-of-center union faction, called much of the opposition to the plan "strange."

It is reported that much of the objection to the pension plan has come from younger members of the union who would sacrifice 8¢ an hr and would not be eligible for benefits for a number of years.

The Ford organization has an unusually large percentage of workers with many years' service. The Ford local tool and die unit, for example, reports almost half of its members are more than 50 years old. Constant agitation by younger members of the union combined with needling by left wing elements is believed to be sufficient to result in rejection of the Ford pension offer which some Ford employees have described as "more generous than the plan which was eagerly accepted by Ford salaried workers."

EXPERIMENTS by Chrysler engineers which started in 1933 have resulted in the adoption of Cycleweld (bonded) brake lining. An adhesive agent, "Cycleweld" is employed to bond the brake linings to brakeshoes of several Chrysler passenger cars and trucks. Conventional rivets are entirely eliminated. With rivets replaced by Cycleweld cement, Chrysler engineers say that the brake linings can now be worn down to their theoretical full depth, giving one third longer service.

The new linings are said to eliminate the chief source of drum scoring. Counter sinking of rivets is no longer necessary. Chrysler also reports that Cyclewelded brake linings have 15 pct more area available for braking than the former riveted type.

Studies by Chrysler engineers have indicated that the Cycleweld bond will withstand extreme stresses and intense cold as well as the extreme heat generated when brakes are applied.

Ford Takes Long Lease On Mound City Arsenal

Detroit

• • • **Ford Motor Co.** has taken a long-term lease on the huge 14-building U. S. arsenal on Mound Road in Detroit and the transfer of operation is scheduled to begin this week.

In addition to housing the Ford parts and service departments, it is understood that axles will be produced at the new location. The wartime arsenal is valued at $30 million and contains a million feet of floor space.

The arsenal was dedicated in 1941 and operated by Hudson Motor Car Co. for the U. S. Bureau of Naval Ordnance until 1944. When it was turned over to Westinghouse Electric and Mfg. Co. operations were discontinued by Westinghouse in February 1946.

A spokesman for Ford denied reports from Washington that the company had agreed to purchase a government-owned gun plant at Canton, Ohio, operated during the war by Republic Steel Corp. Ford admitted that an offer has been made to purchase the Canton plant but said that no sales agreement has been drawn up.

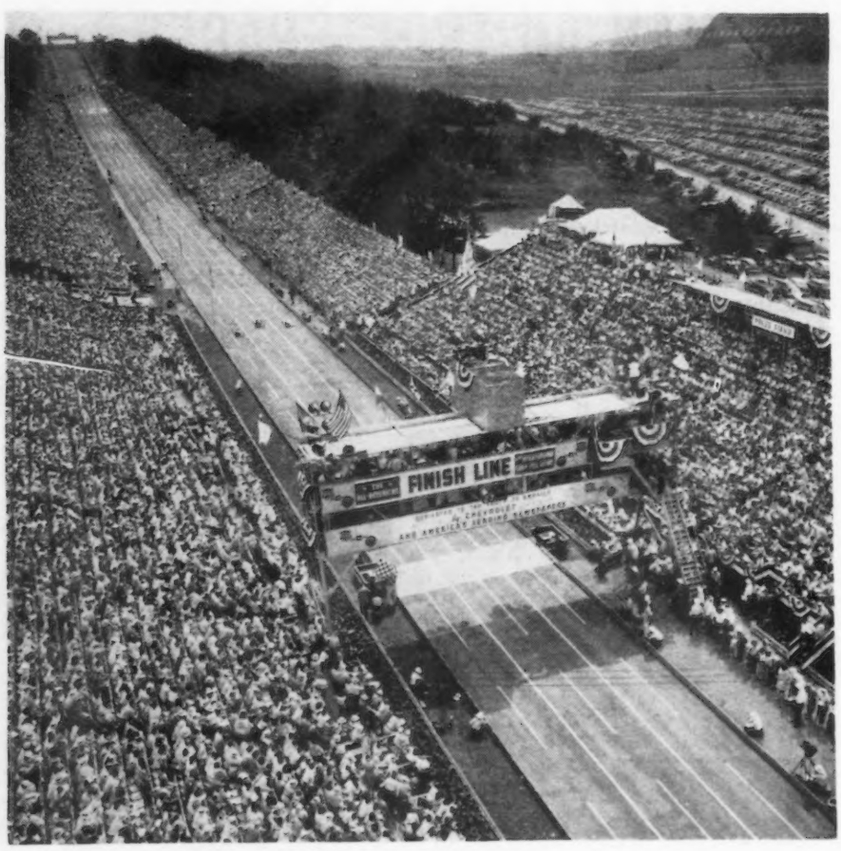
Ford plans to use the former Canton gun plant to produce passenger cars, truck and tractor forgings. It has been estimated that 1000 persons will be employed when full production is reached.

WAA Sells Refinery

Washington

• • • **In the first** refinery disposal since the Army-Navy Petroleum Board that surplus preference be given to purchasers agreeing to service armed force needs, WAA has sold the American Liberty Oil Co. refinery at Texas City, Tex., to the Petrol Terminal Corp. of Philadelphia for $3,250,000. It had a wartime capacity of 100,000 bbl a month.

"CHEVY'S BIG DAY": *An estimated* 100,000 *persons assembled at Derby Downs at Akron recently to witness the* 10*th All-American Soap Box Derby. Kenny Holmboe,* 14, *Charleston, W. Va., was winner of the race and a college scholarship presented by Chevrolet Div. All contestants in the race received gold watches.*



Washington . . . EUGENE J. HARDY

• Bureau of mines changes stand, recommends diesel equipment . . . Emphasizes rising accident rate of electric trolleys . . . Makes up diesel specifications to meet safety code.

WASHINGTON — Reporting on the government's stewardship of the nation's coal mines recently, mines administrator N. H. Collisson placed a great deal of emphasis on the safety record during the 11-month period of government control.

During this period, he declared, some 621 million tons of coal were removed from the pits—an amount second only to the peak record during wartime, in 1943-44, for any comparable period. During the 11 months of government operation, he said, several thousands of mine inspections were conducted which uncovered about 62,000 violations of safety rules and regulations then in effect under the terms of the contract with the miners. More than 40,000 of these conditions had been remedied when the government relinquished the mines and another 10,000 were in the process of being corrected.

"This refutes without question," he declared, "any theory that maximum safety can be accomplished only at the expense of necessary production. Increased safety and maximum production of coal are quite possible."

Virtually the same rules and regulations that the miners insisted be observed during government operation were incorporated into Public Law 328 (Federal Mine Safety Code) enacted by the recent Congress. However, mine disasters and accidents are not necessarily brought about through violations of the safety codes or mine regulations.

For example, just as the Collisson report was about to be released, an explosion in the Old Ben Mine No. 8 in Illinois resulted in the death of 27 coal miners. The final report of investigators, made last week to the Bureau of Mines, stated that the most probable cause of the explosion was ignition of methane gas by a spark from an electric mine locomotive. On the basis of these findings, no safety rules were being violated although workers had been warned to be on the constant lookout for gas.

BE that as it may, the report of the investigation lends added emphasis to a recently issued—and little publicized—report by the Bureau concerning a study of mining accidents for the 15-year period of 1930 through 1944.

This study holds the electric trolley locomotive system directly responsible for 13.5 pct of coal mine explosions during the period and 10.8 pct of mine fires. In addition to 355 lives lost in the 30 fires and 50 explosions from such causes during this period, 428 other workers were killed by direct contact with live trolley wires.

These fatalities might well have been avoided for the most part, according to the Bureau study, by use of other than the electric trolley system. The study goes on to compare the accident record in European mines where the electric system for underground mining has been outlawed for the past 20 years; it traces the growing foreign use of diesel motors in replacing the compressed air machinery.

"No fires, explosions or fatalities from toxic gases are known to have been caused by the use of diesels in European coal mines," according to the report. "In contrast to the 1300 diesel mine locomotives now being successfully used in European mines, only five diesels are operating in underground mines in the United States. These are entirely in noncoal mining."

Historically, trial and rise of the diesel locomotive in European pits is the result of an explosion in a French mine nearly a quarter-century ago and which resulted in a large loss of life. The cause was attributed to a gasoline powered mine locomotive.

This was followed in the United States with enactment of laws in the various states which prohibited the use of internal combustion equipment in underground mines without express approval of the state mining commission concerned. Diesels, of course, are in the internal combustion category.

MORE recently, the Mine Code followed the example set by the states and listed as "nonpermissible" the use in underground coal mines of "internal combustion engines or other machinery" which give off noxious gases.

In direct contrast, European laws — particularly British — prohibit the use of electricity in underground gassy mines. As a result, compressed air engines and equipment were largely used in past years. With the improvement brought about in the diesels, this type of underground transport has gradually been replacing the slower and more restricted compressed air hauling.

For various reasons, complete statistics on fires, explosions and other mining accidents in Europe were not available, the Bureau admits, but in the reams of figures that it did study, it could not find a single casualty directly traceable to diesel operation. This contrasts strongly with the record of 783 deaths—about one a week—which are charged up to the electric trolley system in United States mines during the 15-year period.

"Notwithstanding the numerous production advantages of the trolley system," said the Bureau, "it is evident that the mining people of the United States are paying far too high a price for (this) productive efficiency. There is every reason to believe that well-designed,

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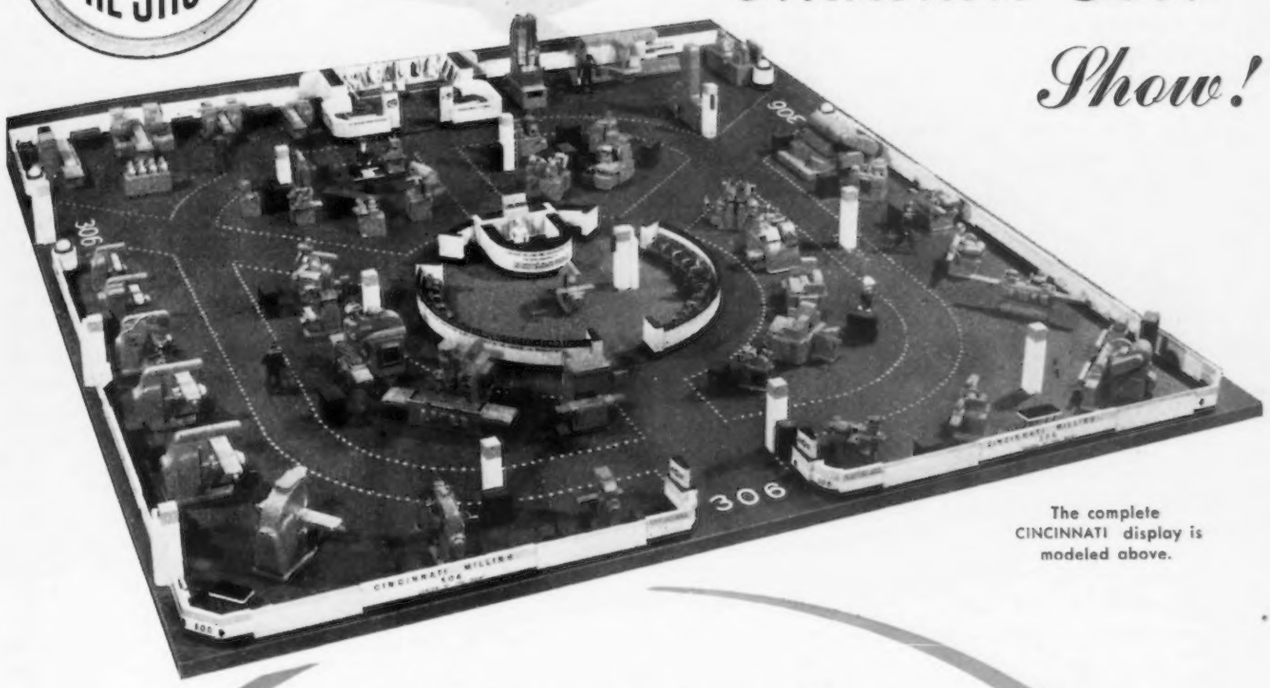

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constructed and maintained diesel locomotives, in addition to being safer, are much more flexible and efficient . . . and are even more dependable."

IN view of this strong endorsement by the Bureau, and more particularly because of the growing emphasis placed on the hazards of mining whenever contracts are under discussion, the question rises as to why more interest has not been displayed in development of diesel equipment for mining operations. While no one will admit it openly, the fact that diesels are nonconsumers of coal undoubtedly has had some bearing on the matter.

It is not that the subject has never been brought up. Instead, it has been brought into discussion over a period of time. More specifically, it was discussed at the time when the present code was being formulated. But no positive action was taken and the virtually prohibitive clause was inserted.

Technically, use of diesel equipment is not precluded; but it does tie the hands of the Bureau insofar as taking any definite steps on its own is concerned.

Under the code, "internal combustion engines and other machinery" cannot be used without approval of the Bureau. However, the Bureau cannot give its approval to such machinery unless it has been submitted for testing. The trouble is that equipment of this type is not being offered for testing and experimental work.

"The Bureau would like nothing more than to have diesel pilot models turned over to us for testing in connection with underground mining," a Bureau official told THE IRON AGE.

ONLY one trial has been made in American coal mines. This was in Colorado during the period of government operation; at that time a diesel locomotive was used for transportation over about one third mile of underground track. It was removed when the miners complained about the fumes.

This stand by the Bureau marks an about-face by that agency which, for years, opposed internal combustion equipment, mainly because of the fumes. However, the Bureau now feels that diesel equipment may easily be adapted to underground use in view of improvements in such components as exhaust gas conditioners (or scrubbers) and flame arresters.

Thus, most of the diesel hazards can be controlled, according to the Bureau, in contrast to those of trolley lines which cannot.

In hope that there will shortly be a definite move toward changing equipment in American mines, the Bureau has drawn up specifications (Schedule 22) for guidance of the diesel industry. These are patterned along the lines followed by the British which require a Buxton certificate—the equivalent of our own Bureau of Mines approval—for diesel operation. Specifications and other details are free for the asking.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

Army Scrap Offered

Washington

• • • **Some 500,000** tons of iron and steel scrap will be sold by the Army on a sealed bid basis by July 1948, the War Dep't. announced this week. Obsolete ammunition will be the primary source of collection.

Robert Wolcott, of Lukens Steel Co., heads the newly-created War Dep't. Steel Foundry & Scrap Industry Committee. War Dep't. officials said the committee would be given free access to Army posts in the U. S. in order to examine salvage stockpiles.

Scrap Shipments Resumed

Washington

• • • **Shipments of war** scrap in Europe to the Canterbury Corp. have been resumed, the War Dept. said this week. The department earlier had ordered shipments stopped while it investigated reports that the scrap shipments were ending at Italian steel mills, rather than at U. S. ports as specified by contract. The European Theater Command has been ordered to keep a close check on Canterbury's activities.

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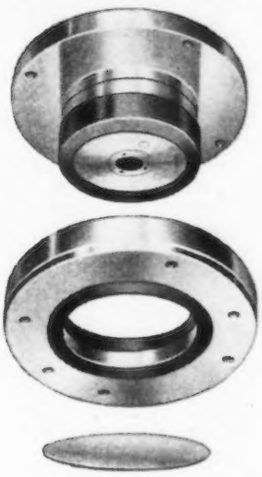

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West Coast . . .

ROBERT T. REINHARDT

• New southern California mill announced by Columbia, and other expansions in West should answer critics . . . Washington foundries in slump . . . Boeing unveils new jet bomber.

SAN FRANCISCO—While senators, labor leaders, and independent steel producers and a former vice president of the United States were busy in Washington and elsewhere building a fire under what they maintain is a recalcitrant industry with some of the attributes of a Missouri mule, the western end of the animal showed signs of considerable life.

Detractors of the steel industry, in the West at least, were somewhat cooled down by the announcement of Columbia Steel Co. to the effect that it would build a cold reduction mill with a capacity of approximately 300,000 tons of sheets a year in the Los Angeles area and have it in operation by the end of 1949 barring unanticipated delays.

It is believed here that this announcement will spike the tentative and conditional plans of H. J. Kaiser for the construction of a rolling mill at his Fontana plant for the production of hot and cold rolled sheets. Whether Columbia's announcement of its new southern mill was timed to affect Mr. Kaiser's most recent proposal to the RFC for a loan reduction and planned expansions, or whether that proposal simply stimulated the U. S. Steel subsidiary to action, is a matter of conjecture. As a matter of record, it is known that U. S. Steel announced in August, 1945, that studies were being made to determine the steps to be taken to modernize and expand its facilities in the Los Angeles area.

There are many well informed observers on the Coast who believe that with completion of the $25 million, 400,000-ton cold rolling mill at Pittsburg, Calif., scheduled for early 1948, and this new rolling mill at Los Angeles, the West's sheet needs will be well taken care of, if not over supplied.

Best pre-war estimate of consumption of steel sheets in the seven western states was approximately 300,000 tons annually, exclusive of tin plate. Estimates of post-war normal consumption of these products run between 500,000 to 600,000 tons.

Production of hot rolled sheets at the Pittsburg, Calif., plant of Columbia Steel Co. is being maintained at the capacity rate of 84,000 tons per year while the cold rolling facilities there are being installed, but this capacity will eventually disappear entirely as hot rolled sheets for the cold rolling process will be imported from the East until hot strip facilties are introduced at the Geneva plant.

It is understood that during construction of the southern rolling mill the Torrance, Calif., plant of Columbia will continue to produce approximately 90,000 tons of sheets per year. However, this plant too may be discontinued when the new mill is completed as the Torrance mills are obsolete according to present standards.

When these two developments come about it will leave the West without basic hot sheet production unless the new plant of Columbia is built to include such facilities. It is understood that present plans call for facilities to process hot rolled sheets and for galvanizing.

Columbia's plant at Torrance has four basic open hearth furnaces with an annual capacity of approximately 200,000 tons, one electric furnace with an annual capacity of approximately 9,000 tons, and its mills produce merchant bars and light structural shapes and hot rolled sheets. This plant has been in operation for approximately 30 years.

THIS latest development of the U. S. Steel subsidiary brings the total actual and projected investment in expansion in this area to approximately $126 million. Included in this figure are the purchase of the Geneva plant for approximately $47 million; increased facilities there at approximately $19 million; construction of the Pittsburg rolling mill at a cost of approximately $25 million; and an estimated $35 million for the plant announced for the Los Angeles area.

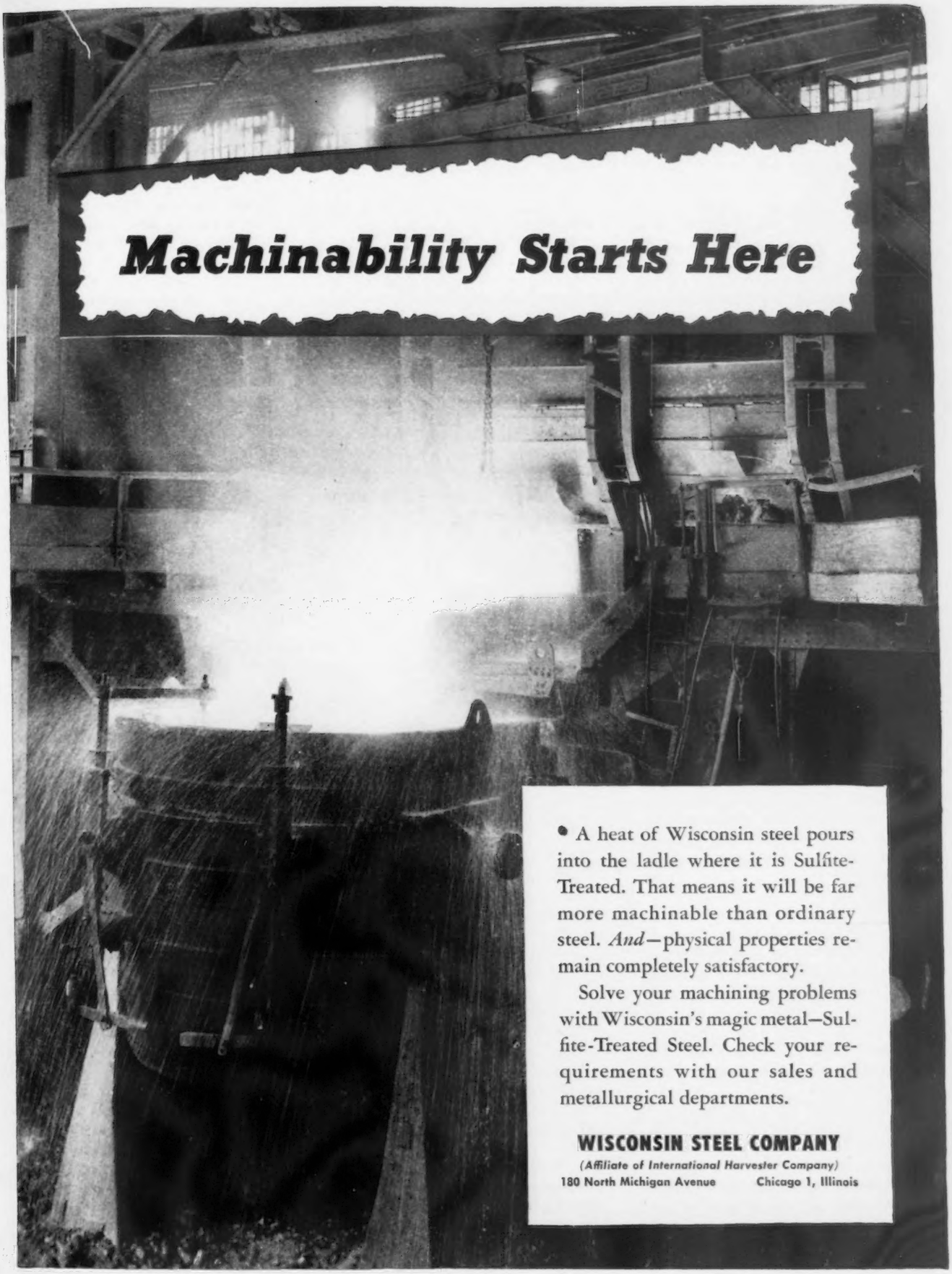
Bethlehem-Pacific Coast Steel Corp. sometime ago announced a $10 million expansion and improvement program for the Los Angeles area which involved a new 50-ton capacity electric furnace and improved finishing facilities. It is also reported that plans are afoot for doubling ingot capacity in Los Angeles. In the San Francisco area this company has already opened a new $60,000 spectrograph laboratory and installed improved nut and bolt facilities at approximately the same cost.

Pacific States Steel Corp. at Niles, Calif., has already been reported as planning to double its ingot capacity to approximately 200,000 tons per year.

These investments and expansions both in progress and announced would seem to provide ample evidence that the steel industry of the West is several steps ahead of the industry's critics.

SEATTLE — Foundries in this area are attempting to determine the cause of the 40 to 50 pct drop in their business during the last two months. This slump has brought about a reduction in the foundry labor force of approximately 30 pct.

Several reasons for the decline in foundry business have been offered by different operators. The reason most often advanced is that buyers are overstocked.



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WISCONSIN SULFITE-TREATED STEEL

For the past few years the foundries have been loaded down with work and the customer has had to place large orders and then wait for the outcome. Lately, as pipelines of supply became full, these orders were filled more rapidly with the result that the customer began getting his castings well ahead of the schedule which he himself had worked out.

Another theory advanced is that because foundries have been enjoying such large volumes with healthy backlogs, their sales departments have been negligent in working up new fields and new markets. They have become accustomed to thriving in a sellers' market so that sales incentive has practically disappeared. Those operators adhering to this theory believe that all that is necessary now will be to put salesmen into the field to develop new business.

Others are of the opinion now that backlogs are consumed, business is returning to its normal peace time level and that facilities increased during the war are having their effect in reducing the volume of individual foundries.

According to the Bureau of Census, there are 39 gray iron foundries operating in the state of Washington, and these produced .4 of 1 pct of the U. S. total gray iron castings during 1946.

Several of the large local foundries are extending their marketing area well into the East in their search for new business and are organizing or expanding sales forces.

* * *

Non-agricultural work in general is reported as employing approximately 5,000 fewer persons in this state now than a year ago, indicating a moderate reduction in manufacturing and construction activities. A total of 670,000 are now employed in non-agricultural endeavors.

However, the State Employment Commission refuses to accept this as a sign of a slump, pointing out that during this year government employment has dropped about 15,000 and shipyard and other transportation equipment producers have laid off 3300. It is pointed out that the majority of these 18,300 have evidently found employment elsewhere.

* * *

Boeing Aircraft Co. is hoping that its XB-47, the Army Air Forces' newest jet-propelled bomber, which last week was rolled out of the local plant for ground test, will go into volume production and thus help maintain present payrolls.

Employing sharply swept back wings and tail surfaces, the "Stratojet" as it has been dubbed, this new experimental bomber is similar in overall size to the Boeing B-29 Super Fortress with a wing span of approximately 116 ft and a length of 108 ft.

Powered by six jet engines designed and built by the General Electric Co., it is expected to develop high speeds at long range. Four of the power plants are mounted in pairs slung under the inboard section of the wings and one of the engines is mounted on each wing near the tip.

The XB-47's landing gear is of the tandem type, permitting especially thin wings. The main gear consists of two double wheel units which retract into the fuselage and small outrigger wheels which provide lateral stability during ground operations fold into the inboard engine nacelle.

Reversing a trend, Boeing is now hiring mechanically skilled persons at the rate of approximately 200 a week, according to Les Isaacson, director of personnel, to meet increased production schedules.

SALT LAKE CITY—If top CIO officials persist in a policy of refusing to sign anti-Communist affidavits under the Taft-Hartley act they will sorely disappoint many rank and file members of the International Union of Mine, Mill & Smelter Workers. The labor boys who have been in the middle of a Communist fight on the anti side, as many of the mine and smelter workers have been, are not disposed to sacrifice an effective weapon to fine theoretical points in the field of civil rights.

Willard Y. Morris, legal counsel of district 2, IUMM&SW and the Utah CIO, was not speaking for himself alone when he expressed the hope before the convention of the district union auxiliary here this week that "President Philip Murray would have the wisdom and courage to face the problem of Communism by recommending an effective means of cleansing the CIO ranks of reds. The Communists are trying to obtain control of the labor movement. They are fighting ruthlessly, and I do mean ruthlessly," he said.

"The Taft-Hartley act is a clumsy piece of legislation but its provisions to help rid unions of reds and to correct union abuses are the only good things in the law for unionism," he added.

Some of the union rank and filers hold more pronounced views on the subject than were expressed by Mr. Morris. They regard the campaign for noncompliance with the law as a Communistic maneuver and think that the anti-Communists would be plain suckers to let them get away with it. A few are beginning to wonder out loud if the vague and generalized blasts of their leaders against the new labor act aren't prompted more by concern over the prerogatives of leadership than the welfare of unionism.

The special election to be held by the IUMM&SW this fall is not going to settle the red controversy within the union. The antis say they were outmaneuvered again and that the Communists will be more firmly entrenched at the top after the election than they are now. As one active anti-Communist unionist puts it:

"I am against secession but it looks like there has got to be a blowup before we can get out from under the CP's."

Non-Aviation Properties Sold by Convair to Avco

San Diego

• • • **Consolidated Vultee** Aircraft Corp. is selling its non-aviation properties to Avco Manufacturing Corp. This move will enable Convair to concentrate its activities in the field of aircraft manufacture. Under the terms of the agreement, a new corporation will be organized to acquire the non-aviation interests of Convair, including the Nashville Div. and a 48 pct interest in ACF-Brill Motors Co. and Hall-Scott Motor Co., makers of buses, trolley coaches, industrial, truck and marine engines.

Convair stockholders will be given an opportunity to maintain their pro rata share in both the aviation and non-aviation enterprises.

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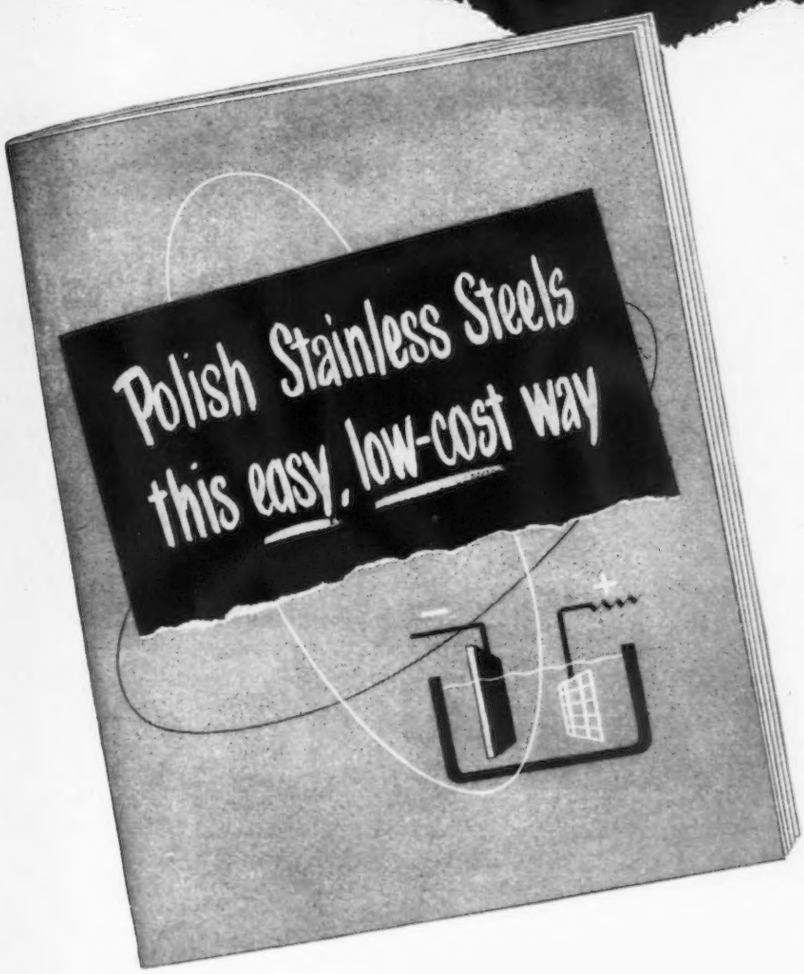

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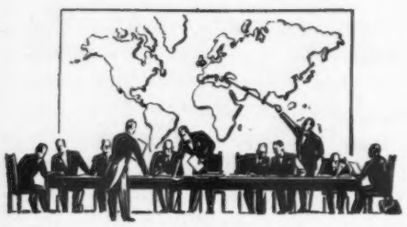
European Letter . . .

• Diagnosis of British domestic economy . . . Work alone not the answer . . . Some is useless . . . It must be properly directed . . . Too much capital expenditure planned for available resources.



LONDON—There is a lull this week in the storm. It is, of course, not yet over, and next week Sir Stafford Cripps, the original inventor of austerity, is to disclose his plan for exports, which will certainly not be pleasant reading for the domestic consumer. But this week it has been the turn of soothing syrup *à la* Strachey, and ringing protestations of faithfulness to destiny at Southport.

The interval will be welcome if it is used for some clearing of minds. The government has been buffeted in the last few weeks by criticism, the range and strength of which must be almost without precedent. No doubt they have deserved it. But criticism is not enough, and not all of the critics would have an answer ready if they were challenged to say what they would do now. When the crisis of 1947 first came over the horizon there was no alternative policy in being, either in the ranks of the official opposition or elsewhere. Gradually, an alternative is crystallizing as public discussion continues.

But it is neither clear nor definite yet and the best service that the government's critics can render, when their anger is spent, is to give what help they can in clarifying the issues and in distinguishing sense from nonsense. There has been a great growth of humility among the members and supporters of the government in recent months, and if an alternative policy were clearly and cogently formulated, they might even adopt it as their own. And such a turn of events is certainly a far more practicable, and to very many people would seem a far more desirable, issue from our present afflictions than a change, before the general election, in the party complexion of the government.

Diagnosis is an essential preliminary to prescription, and it is necessary first to agree on what is chiefly wrong with the British domestic economy—except of course for those who still hold that nothing is wrong in these islands and that all our troubles come from abroad. The official doctrine is that what is chiefly wrong is low output due to insufficient effort—We Work or Want is the slogan. An attempt was made by *The Economist* some weeks ago, not indeed to suggest that this diagnosis is wrong, but to show that it is very incomplete and that it omits the major piece of the puzzle.

THE general level of output of the community, it was suggested, is not low, but high; what is wrong is partly that it is distorted and mainly that it is overwhelmed by the wholly unreasonable demands that the community is putting upon it, that lack of supply may be a difficulty, but that excess of demand is a much greater.

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No one would argue against the necessity for harder work and greater effort. But indiscriminate higher effort all round is not the remedy. For one thing, there are millions of men and women who cannot work any harder because they are limited by shortages of materials. And for another, the nation does not need more of everything. If everybody throughout the nation were to work an extra hour a day, the main effect would be to concentrate a still greater weight of purchasing power, derived from the payment for the extra work, on the few crucial shortages.

IT can even be argued that the nation would benefit if less work were done in those industries which, less essential themselves, compete for manpower, for materials and for resources of all kinds with the crucial bottleneck industries, those producing coal and power, those producing exports, and those producing food. Just as the 1940 slogan of "Go To It" would have been more accurate if it had been "Munition Workers, Go to It; the Rest, Keep out of the Way," so now the rugged simplicity of "Work or Want" is misleading.

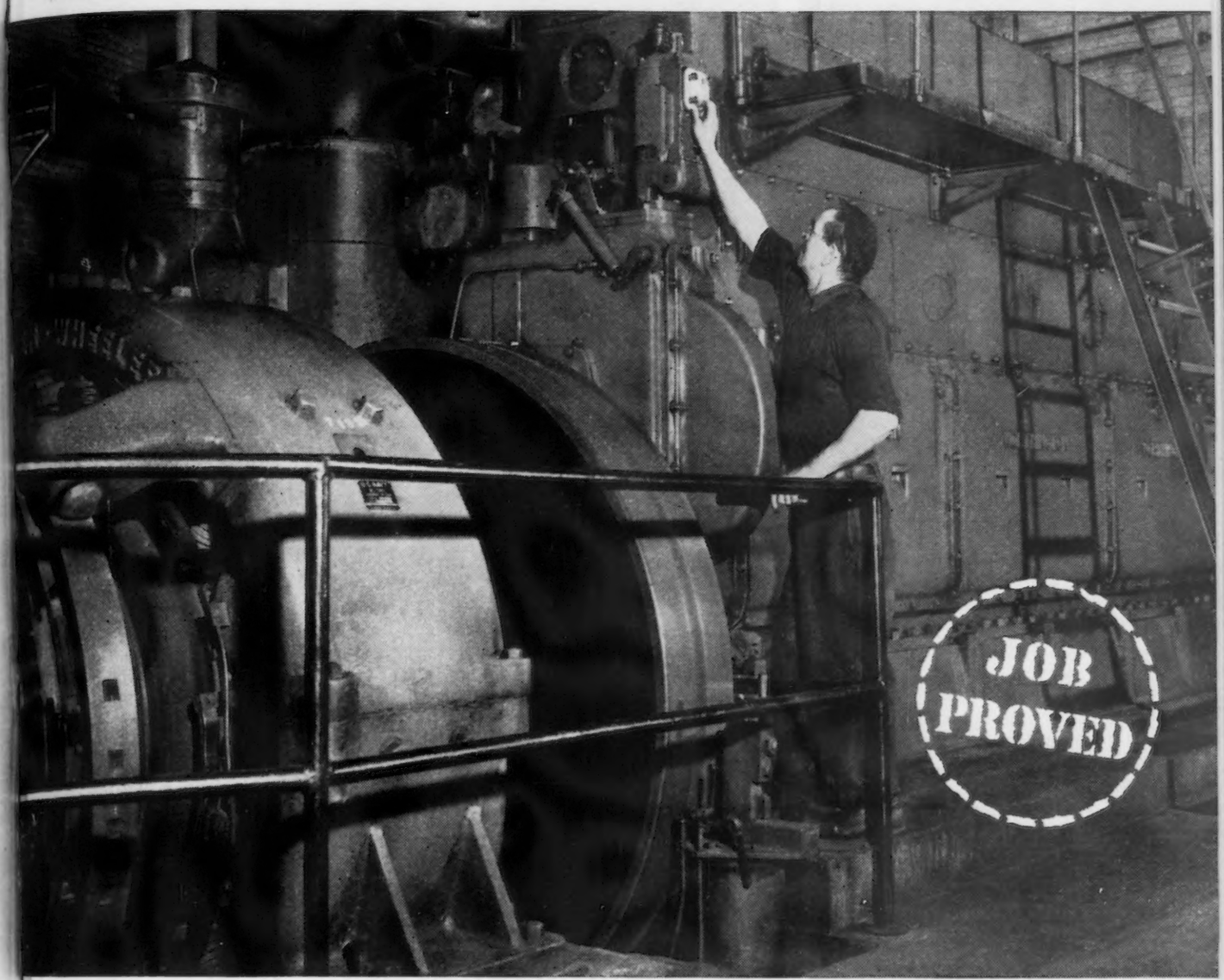
The difference is that while the oversimplification of 1940 did no harm, that of 1947 may do plenty, because it distracts the public's attention from the crucial necessity of giving the essential industries room to breathe, of providing for them a labor supply ample to their needs, of allowing them to build up the stocks of materials and products that are essential to nonstop running, of giving them prompt and efficient transport service—all of them things that are incompatible with an all-round intensification of activity.

The most essential thing for the nation to do at present is not to put an equal pressure for increased output on all its activities indiscriminately, but to do what is almost the opposite, to restrain some of its projects so that others may go forward, not to try to advance all along the line, but to withdraw units of resources for regrouping.

ANOTHER example of the need for clear thinking can be found in the country's program of capital expenditure. It is probably true that the greatest single cause of the present inflationary state of affairs can be found in the fact that the community is attempting to carry out more capital expenditure of all kinds—in building, reequipment and restoring working capital—than there are resources to implement.

It is therefore tempting to say

Rings Free . . . After 9,200 Hours



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that one of the first things to be done should be to cut down the capital program drastically. The Federation of British Industries, in the memorandum they published last week, suggested a reduction of £450 million, which would be about one-third of the total.

It is perfectly true that the present capital program could and should be pruned. But it is supremely important that the process should be a discriminating one. Some capital expenditure can be postponed—new government offices and some of the housing projects are in this category—but other forms of capital expenditure are the most vitally necessary things that the country is now attempting to do, since they offer by far the best prospect of raising its productive efficiency and increasing its exporting power.

The way to tackle the capital program is to draw two clear distinctions. The first is between "productive" and "nonproductive" capital, defining productive," for once, in the narrow sense of those forms of capital which will contribute directly and indispensably to higher output within a period of 2 or 3 years. A dwelling-house may be indirectly productive in the long run, but it is "productive" in this sense only if it is strictly necessary to get an additional coal-miner, farm-worker or export-producer on to the job.

The second distinction is within the productive category, between capital projects that will earn or save dollars and those that will not. The order of priority should be dollar-saving productive capital first; other productive capital second; nonproductive capital third.

The first category should not be cut at all; indeed, one of the objects of the whole policy should be to give it elbow room to go ahead more rapidly. This should be, as in Russia, the superpriority of all priorities. The second category should not be cut very much. The third category should be left to take its chance with the rest of the community's expenditure.

THIS procedure might very well result in a capital program that was still larger than the savings available to finance it. This is the more likely because the flow of funds available for capital creation has hitherto been swollen by the government's overseas borrowings. These have now ceased, and if the capital program has to be cut down to the total of gross savings being done by the British people and by business firms, then it will indeed have to be cut.

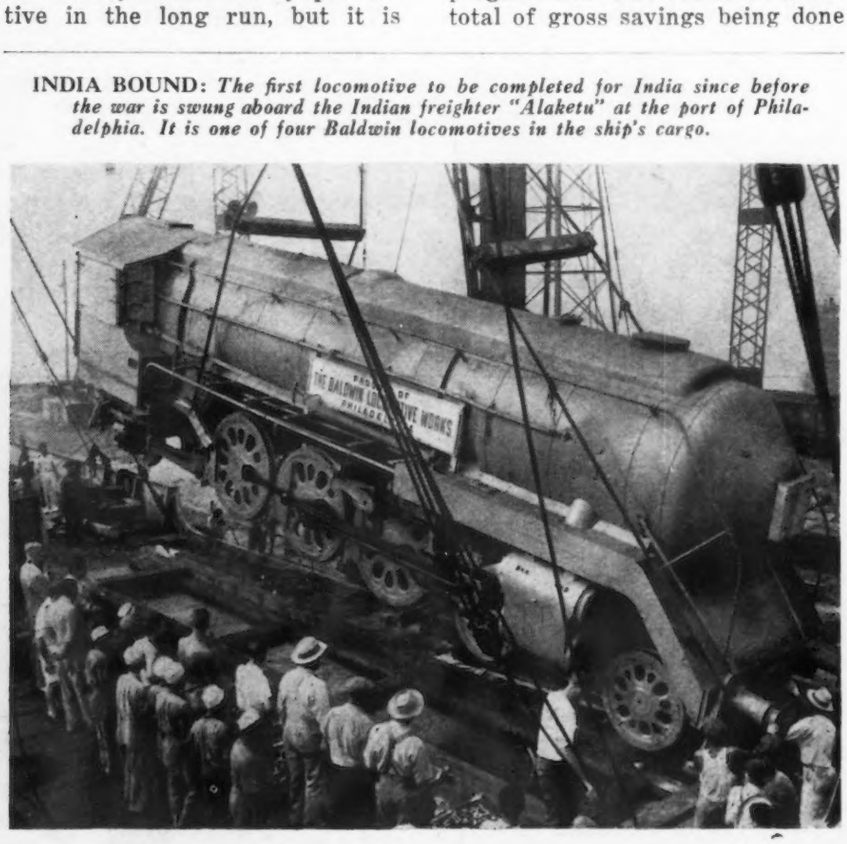
No one can feel very happy about the conclusion that unemployment is a necessary element in keeping the economy under control and responsive to the helm. How little Mr. Shinwell has found it possible to abolish the fear of unemployment and poverty was illustrated, almost as we spoke, by the National Coal Board's action in dismissing the striking coal miners of Grimethorpe. And how little Mr. Shinwell has discovered anything to take the place of these sanctions was shown by the failure of the appeal he made, in person, to the same striking miners.

Why is there so much unwillingness to face the facts? There must be, in every economy, some mechanism for adjusting individual desires to collective reality. What alternative mechanism have the Socialists to suggest in place of the carrot of material rewards and the stick of fear of insecurity—something that will work, not in the sweet by and by, but here and now? Can they point to an effective working economy where these methods have been successfully replaced by something else?

Of course they are unpleasant. Of course they are unpopular. Two resolutions that would be passed by acclamation at any Congress of Donkeys, held at Southport or elsewhere, would be that the distribution of carrots should not depend on the amount of work done and that sticks should be wholly abolished. But where then would be the motive power of the Donkey Economy?

THE stakes are high. *The Economist* believes that keeping the British economy alive is, for the moment, far more important than anybody's dreams of better worlds to come. Somehow, reinforcements must be rushed to the danger points and until some reason is produced for believing that some other method will do the trick, we shall stick to our belief that a moderate degree of elasticity in the labor market is an indispensable prerequisite for the decongestion and lubrication of the British economy. It is well worth while postponing the millennium to avoid starvation.

INDIA BOUND: *The first locomotive to be completed for India since before the war is swung aboard the Indian freighter "Alaketu" at the port of Philadelphia. It is one of four Baldwin locomotives in the ship's cargo.*



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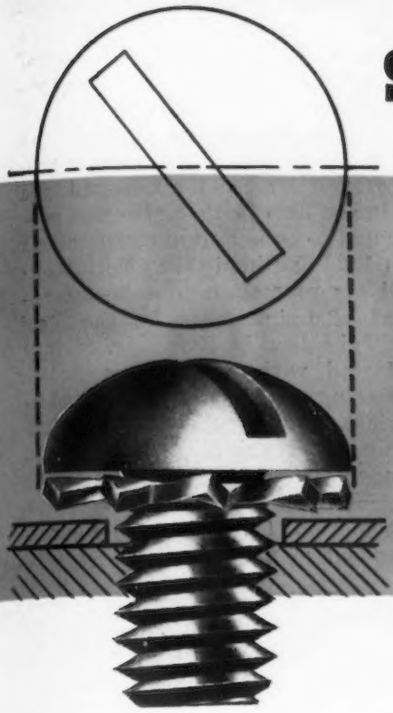
SEMS *by* SHAKEPROOF



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In sems by Shakeproof you not only have all the time and labor saving benefits of the pre-assembled principle and the extra locking power of Shakeproof's tapered-twisted teeth but also certain other special advantages which are exclusive to this combination unit.

To appreciate this fact consider these mechanical features:

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2. The thread which holds the lock washer on the screw keeps it approximately parallel to the clamping surface of the screw head and eliminates any possibility of canting which might cause buckling of the parts being fastened. Thus, when the sems is driven home, the locking teeth are automatically positioned so that they can function to their full power.
3. Concentric tooth seating assures easy installation in narrow channels or where screws must be placed close together because the washer does not protrude far enough to interfere. This also assures neat appearance and protection against catching edges for each fastening.

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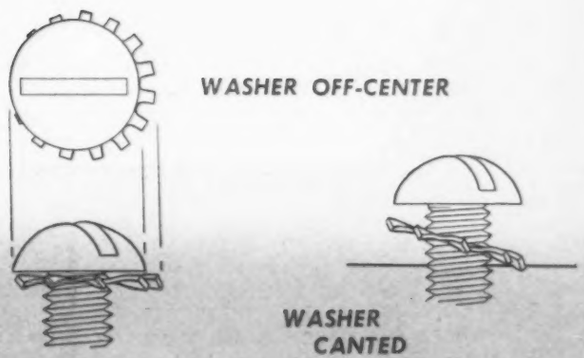
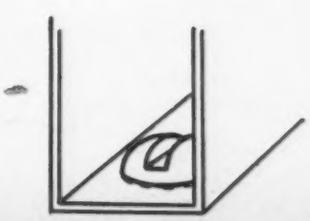
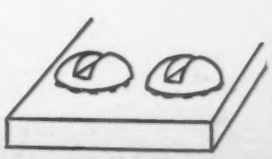


THIS DOES HAPPEN!



Narrow channel application showing why the washer must be kept concentric with the screw and no larger in overall diameter than the screw head.



With concentric seating plus correct overall diameter of the lock washer, screws can be placed close together. Note the neat appearance of each fastening.

PERSONALS

o o o

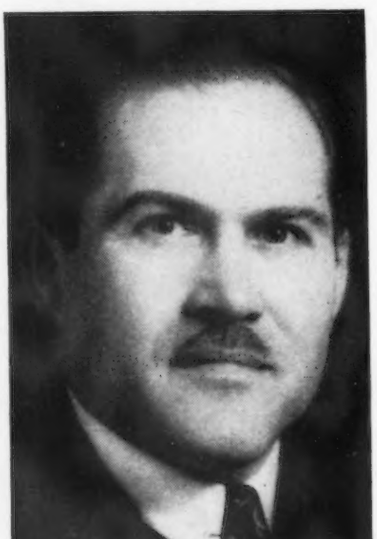
• **R. V. Safford** has been appointed in immediate charge of the Research and Development Div. of Pittsburgh Consolidation Coal Co.'s coal gasification pilot plant at Library, Pa. For the past 4 years he has been with the Stanolind Oil & Gas in complete charge of the construction, maintenance and operation of the Synthol pilot plant at **Tulsa, Okla.** He also supervised the chemical byproducts plant. **Thomas G. Reynolds** has been appointed chemical engineer on coal gasification. His experience includes 4 years with Continental Oil, 5 years as process and project engineer for Foster Wheeler, and war experience for Columbia and Kellex on the atomic bomb project. **J. Hunter Johnston** has been appointed control supervisor in charge of accounting and purchasing sections and assigned to the service department, headed by Gerard C. Gambs. He has been connected with the Pittsburgh Coal Co. for the past 11 years. **Warren R. Eakin** has been appointed economist and assigned to the service department. His previous position was with Westinghouse Electric and his experience has included statistical analysis, industrial engineering and market research and development.

• **Dr. Frederick Port** has been made production superintendent of Cribben & Sexton Co., Chicago. He succeeds Fred Doering who has been directing the manufacture of Universal Gas Ranges for the company since 1943. Dr. Port joined Cribben & Sexton in 1946 as chief engineer and remained in this capacity until his recent appointment.

• **A. F. Boucher,** welding engineer for the Lincoln Electric Co., handling special accounts in the Detroit area, has been transferred to become district manager for the Milwaukee office. Mr. Boucher started with Lincoln Electric in 1936. **Marshall Ford** has been made district manager for the Lincoln Electric Co.'s Minneapolis office. He has been a welding engineer for the company since 1941 in the Pittsburgh district.

• **Mark Neitlich** has joined the staff of Horizons Inc., as a research assistant at the new laboratory of the corporation in Cleveland.

• **O. L. Howland** has been appointed sales manager of the welding division, Metal & Thermit Corp. with headquarters at Chicago. Mr. Howland came with the Company in 1943 as district manager of the Chicago branch. As aide to Mr. Howland, **William C. Cuntz** has been made assistant sales manager of the corporation's welding division with headquarters at Pittsburgh.



WILLIAM E. CLARK, vice-president, Dravo Corp.

• **William E. Clark,** general manager of Dravo Corp.'s Keystone Div., has been elected a vice-president of the corporation, at Pittsburgh. Mr. Clark was appointed assistant to the vice-president of Dravo's Wilmington, Del., shipyard in 1942, and in 1944 was appointed administrative manager. In 1945 Mr. Clark was transferred to Pittsburgh as general manager of the Keystone Div. In 1946 he was elected a member of the board of directors of the corporation.

• **Waverly A. Reeves,** turbosupercharger production pioneer, has retired from the aircraft gas turbine division of the General Electric Co., Schenectady, after 43 years of service with the company.

• **Harry Y. McCool, Sr.,** superintendent of maintenance of the Timken Roller Bearing Co.'s Steel & Tube Div., Canton, Ohio, has retired after more than 31 years of service. **Leland S. Steiner** has been named as Mr. McCool's successor. Mr. McCool joined the Timken firm in 1915. He was promoted to tube mill superintendent in 1920 and held that position until his promotion to superintendent of maintenance for the Steel & Tube Div. in 1938. Mr. Steiner started with the Timken Roller Bearing Co. in 1925, in the electrical department of the Steel & Tube Div. and was promoted to superintendent of the department in 1938. In 1945, he received his promotion to assistant superintendent of maintenance.

• **R. S. Koroncai,** formerly with the National Acme Co. and Hydraulic Equipment Co., has been appointed district sales manager covering Ohio and western states, for Scheneker Iron Works, Buffalo.

• **Dr. Bernard Kopelman** has been appointed section head of the metallurgical research group, Sylvania Electric Products Inc., at Bayside, N. Y. Dr. Kopelman rejoined Sylvania's metallurgical research staff after a recent association with the U. S. Finishing Co., Providence. He had previously been with Sylvania for 2 years.

• **Alfred E. Siegel** has been appointed advertising manager for all divisions of the Royal Metal Mfg. Co. of Chicago.

• **Frank A. Young** has been named manager of the Duluth, Minn. branch office of Allis-Chalmers Mfg. Co. An employee of Allis-Chalmers since 1923, Mr. Young started work in the company's shops, has served in the erecting department, engaged in special field work, and was connected with the firm's basic industries department before being transferred to Duluth. He had been a representative in the Duluth office since 1944.

• **Marian C. Stoffel** has joined the staff of Bjorksten Research Laboratories, Chicago, as technical secretary, and **Harry DeWalt, Jr.,** has become a research chemist for the same organization. Miss Stoffel was formerly an executive secretary for the Nylen Products Co.

• **L. D. Huestis,** general manager of the Portsmouth Steel Co., Portsmouth, Ohio, has retired from active management of the company, but will remain with them in an inactive position as consultant. Mr. Huestis has been with both Portsmouth Steel and its former company, Wheeling Steel Div., for more than 27 years, and has held several positions in the plant. Before his becoming manager he was superintendent of the coke plant. He is replaced by **E. A. Eyman,** who has been with the steel industry since 1909, when he took his first job as timekeeper with the old Portsmouth Steel Co. Later when Wheeling Steel built their division at Portsmouth, Mr. Eyman remained there and held different positions in almost every department in the company.

• **Forest D. Siefkin,** vice-president and general counsel, has been elected to the board of directors of the International Harvester Co., Chicago. **Giles C. Hoyt,** formerly vice-president, foreign operations, has been elected executive vice-president. **Levin H. Campbell, Jr.,** formerly vice-president and coordinator of facilities expansion, was elected executive vice-president. **Robert P. Messenger,** formerly vice-president, farm implement division, becomes vice-president of foreign operations, succeeding Mr. Hoyt. **Ralph C. Archer,** formerly vice-president, farm tractor division, becomes vice-president of the farm implement division, succeeding Mr. Messenger. **Michael J. Graham,** formerly assistant to the vice-president of manufacturing, was appointed general manager of the farm tractor division, succeeding Mr. Archer as executive head of that division.

• **Troy T. Alverson** has been appointed assistant manager of the Dust & Fume Control Div. of the American Wheelabrator & Equipment Corp., Mishawaka, Ind. Mr. Alverson was formerly a district sales representative for the company with offices in Baltimore. **Fred E. Uhl** has been appointed district sales representative, succeeding Mr. Alverson, with offices in Baltimore. Mr. Uhl was formerly a sales engineer for Westinghouse Electric Co., New York City office.

MORTON J. RAINEY (left), and ANTHONY J. SNYDER (right), vice-president, Morse Twist Drill & Machine Co.

• **Morton J. Rainey** and **Anthony J. Snyder** have been elected vice-presidents of the Morse Twist Drill & Machine Co., New Bedford, Mass. Mr. Rainey has been associated with Morse for many years in the capacity of general sales manager, and Mr. Snyder, likewise, as works manager.

• **I. L. Pierce** has been named director of the Ford Motor Co., Dearborn, Mich. service department. **R. W. Hickl** will manage auto accessory sales activities, and **Arthur W. Kelley** will manage accounting for parts and accessory sales. Mr. Pierce has been associated with Ford since 1919. Mr. Hickl comes to the Ford Motor Co. from Montgomery Ward. Mr. Kelley spent 5 years in the U. S. Army services of supply in the western Pacific theater.

• **Arthur H. Brown** has been made sales manager of the Coatesville, Pa., sales district of Lukens Steel Co. Mr. Brown was associated with Lukens since 1930, being previously connected with their New York sales office. **W. Harrison Lackey** succeeds Mr. Brown as district sales manager of the company's Pittsburgh office. Mr. Lackey, who has been with Lukens for 9 years, formerly was sales representative of Lukens By-Products, a subsidiary company.

• **Gerald E. Felber** has been appointed assistant purchasing director of the Wickwire Spencer Steel Div. of the Colorado Fuel & Iron Corp. in Buffalo. He succeeds **Arthur R. Kinney,** recently named divisional director of purchases.

• **Frank E. Wartgow,** who until recently was office manager of the American Foundrymen's Assn., has joined the sales group of the foundry equipment division, Whiting Corp., Harvey, Ill. Prior to Mr. Wartgow's association with the AFA, he was associated with the Hasbrouck Haynes Engineers as a supervising engineer.

• **Charles J. Bailey** has been named New York regional sales manager for the Phosphor Bronze Smelting Co. In this capacity he will serve the company's customers in the New York City, Long Island, and Northern New Jersey territory. Mr. Bailey comes to the Phosphor Bronze Smelting Co. from the Bridgeport Brass Co., where he was assistant sales manager.

• **Frank H. Schryer** has been appointed superintendent of the Peru, Ill. plant of the Meyer Furnace Co. He recently served as general superintendent of the L. J. Mueller Furnace Co., and has a background of 30 years' experience in manufacturing and foundry work.

• **J. F. Schwartz,** formerly with the inspection department of Weirton Steel Co. and ordnance inspection of the U. S. Navy, now is operating the Washington Precision Grinding Co., Washington, Pa.

• **Fred J. Walters, Jr.** has been named manager of industrial relations, Hotpoint, Inc., Chicago. Mr. Walters has been industrial relations staff officer for all affiliated General Electric companies, and comes from General Electric X-Ray Corp., where he was vice-president.

• **Bert Arant,** formerly affiliated with the melting departments of Universal-Cyclops Steel Corp., has joined the Titanium Alloy Mfg. Co., Niagara Falls, N. Y., as development engineer. Mr. Arant will work in the western Pennsylvania and Ohio districts.

• **L. W. Hayden** has been named resident vice-president of Lindberg Engineering Co., New York City, and will be in charge of all east coast sales offices, including Boston, Hartford, Philadelphia, Durham, N. C., and New York. In addition he will be in charge of all export sales. Mr. Hayden, who joined the Lindberg organization in 1935, will continue to maintain headquarters in New York City. **G. W. Helsberg,** formerly in New York, is now in charge of the Boston office, and **R. W. Dougherty,** formerly in charge of the Kalamazoo, Mich., office, will be in charge of a new Lindberg office to be opened in Philadelphia. **S. K. Oliver,** formerly in New York, will move to the Cleveland office, and **T. M. La Crone,** formerly with General Motors, has been placed in charge of the Kalamazoo office.

• **Dr. Maxwell Gensamer** has been appointed assistant to director of research of Carnegie-Illinois Steel Corp., Pittsburgh. He served 5 years as plant metallurgist for the Page Steel & Wire Div. of American Chain & Cable Co. In 1945 Dr. Gensamer joined the staff of Pennsylvania State College as professor of metallurgy and head of the department of mineral technology, the position he held until his present appointment with Carnegie-Illinois.

ROY E. McCLUSKEY, vice-president in charge of sales, R. G. LeTourneau, Inc.

• **Roy E. McCluskey,** assistant treasurer of R. G. LeTourneau, Inc., Peoria, Ill., has been advanced to the position of vice-president in charge of sales. He joined the LeTourneau company in 1941 and has progressively risen from the accounting department to his present duties as a vice-president. **Oscar W. Nelson** has resigned as vice-president and general manager of the Peoria Div. **Robert F. Nelson** has resigned as vice-president and assistant to the president, but is continuing his affiliation with the company as a member of the board of directors, a position he has filled since 1944. He will maintain his executive offices in New York.

• **Dr. G. F. D'Alelio** has been appointed assistant director of research for Koppers Co. Inc., Pittsburgh.

• **Thomas M. Camerden** has been named manager of sales in Cincinnati for American Steel & Wire Co., Cleveland, succeeding C. J. Boon, deceased. Mr. Camerden first became associated with American Steel & Wire Co. in 1909 in the New York office, where he remained until he was appointed assistant manager in 1933. In 1940 he was transferred to the Detroit sales office as assistant manager, which position he has held to the present time.

• **William M. Austin** has been elected president and chairman of the board of Austin-Hastings Co., Inc., Cambridge, Mass. Mr. Austin started with Austin-Hastings Co., Inc. in 1926, first as a salesman, then manager of one of the divisions, and later treasurer of the corporation. **Arthur B. Kettle** has been elected executive vice-president and general manager of Austin-Hastings. He started with the company in 1932 as manager of the machinery division, and became a director of the corporation and vice-president in 1938. **Leon L. Clore** has been appointed manager of the machinery division. He served his apprenticeship with Westinghouse Electric Corp., and started with Austin-Hastings Co. in 1935. He succeeds Mr. Kettle. **Stuart L. Harrod** has been appointed western New England representative for the machinery division succeeding Mr. Clore. Mr. Harrod went through the apprentice course at General Electric Co. spending several years in their planning division and later became equipment engineer of that company.

...OBITUARY...

• **George C. Bryant,** 75, who retired as secretary of the Farrel-Birmingham Co., Inc., Ansonia, Conn. in 1943, died Aug. 28.

• **Victor L. Reid,** 42, president of the Triangle Mfg. Co., Inc. of Easthampton, Mass., died Aug. 20. Mr. Reid was associated with the toolmaking concern and was its president since 1944.

• **William M. Baer,** 43, purchasing agent for the Milcor Steel Co., Milwaukee, died Aug. 30. He came to Milcor from the firm's Canton, Ohio, branch 7 years ago.

• **George K. Conant,** president of the Sligo Iron Store Co., St. Louis, died Sept. 4. He was a former director of the St. Louis Chamber of Commerce.

• **Lee E. Gross,** 53, superintendent of the Buffalo Slag Co. for 11 years, died Aug. 30. He was employed by the Wickwire Spencer Steel Co. in Buffalo before going with the slag company in 1926.

Industrial News Summary...

- **Gray Market Big Factor to Some**
- **Five Percent of Steel Moving There**
- **Significance Seen Much Larger**

THE amount of steel moving in the gray market is less than 5 pct of total shipments according to a comprehensive survey made by THE IRON AGE. (Details are on p. 111.) But opinions from steel users show conclusively that the gray market is no small potato in the present industrial stew—it is a very hot one.

Despite the possibility of some pangs of conscience in answering a questionnaire dealing with gray market activities, 29 pct of 1500 companies, representing a cross section of steel consumption, replied to the questions. Efforts to pooh pooh the seriousness of the gray market are wishful thinking, judging by the statistics compiled as the result of the survey.

Although only 4.3 pct of the steel purchased during the past 6 months was classified as gray market material, more than 43 pct of the steel consumers replying have dabbled in the gray market for supplies during that time. If the percentage of gray market steel indicated in the comprehensive sample testing is plotted against total finished steel shipments expected during 1947, it is estimated that 2,600,000 tons will have been ultimately disposed of by the gray market. This figure supports testimony in Washington last week that close to 3 million tons of black market steel on an annual basis was reaching consumers.

Steel leaders have repeatedly denied (and exhaustive investigation by THE IRON AGE supports their postion) that they have had any traffic with the gray market and maintained that they cannot be held legally responsible for this situation. Regardless of this it appears that one of the major problems facing the steel industry in years to come is the fostering of better customer relationships, for the simple reason that 40 pct of the purchasing agents answering questionnaires place the blame for the gray market on steel producers. Exporters were held responsible by 21 pct of steelbuyers, and 39 pct of the consumers place the blame for the gray market squarely upon themselves.

IT is apparent that the gray market will be extremely active until steel supplies catch up with demand. Policing of customers by steel producers is a physical impossibility, but several steel companies have indicated that they were watching the destination of some of their steel to see that it did not land in the gray market. They have indicated some success along this line, but no company has stated fully what it has done or reported results that have been obtained.

Steel buyers, in answering a question as to whether the gray market is increasing, are at some variance with actual conditions uncovered in some areas during the past few weeks. Some 32.8 pct of steel consumers think that the gray market is expanding, while 67.2 pct believe it is decreasing. Face-to-face interviewing by IRON AGE representatives within the past 10 days to supplement the questionnaire shows some evidence that the trend in the gray market, for flat-rolled products at least, is turning upward again.

Hardly any steel customer derives the bulk of his steel from the gray market. In most cases only the tonnages necessary to keep manufacturing operations at high levels to meet competition are purchased at the fantastic prices ultimately charged for steel sheets. The storm and fury arising from the fact that customers are forced into the gray market and are forced to pay such fancy prices is out of all proportion to the total tonnage involved.

ALMOST 10 pct of those queried pay up to $60 above mill prices for their steel. It is estimated that the average delivered price for cold-rolled steel products, including extras and freight, is around $80 a ton. Those paying from $61 to $100 a ton above mill prices numbered up to 39.5 pct of those answering the query; 25.8 pct paid between $101 and $150 above the mill price, and 25.5 pct paid more than $150 above the so-called delivered mill price. A weighted average of these premium prices indicates that all users combined paid at least $114 more than they would have paid had their normal suppliers furnished them with the necessary material.

Major sources of gray market material are: (1) redirected export tonnage; (2) redirected tonnage shipped to customers who do not need as much as they are getting; and (3) the tremendous growth of so-called conversion deals. It is the latter source which is causing so many steel buyers to approach the blood vessel bursting stage. In these deals all the steps required have the "legitimate" label after the consumer has supplied ingots for which he pays anywhere from $40 to $50 above published price of this product. The rub comes when the conversion charges by regular steel mills to reduce ingots into sheets takes out of the consumers' pocket an amount corresponding to regular gray market prices for steel coming from other sources.

The steel ingot rate rose six points this week to 90.5 pct of rated capacity, following the end of production tieups in the Pittsburgh district. A further gain is expected next week. Scrap prices have withstood severe testing in the past few weeks and there was no indication this week of any immediate drop from present price levels. Steel demand showed no signs of slackening and most centers reported an actual increase in the volume of new business.

• **STEEL PAYROLLS**—In 7 months of 1947 the steel industry's total payroll for employees directly engaged in the production and sale of iron and steel products exceeded the payroll for the entire year 1940, the American Iron & Steel Institute says. Total wages and salaries paid to steelworkers during July amounted to $163,166,000, compared with the June total of $167,625,000, according to the institute. Average hours worked by hourly, piecework and tonnage employees in July was 35.9 hr, compared with 38.1 hr weekly in June. Total employment in the industry amounted to 623,400 in July compared with 622,600 employed in June. The average hourly wage for July for wage earners amounted to $1.539, compared with $1.547 for June and $1.351 in July 1946. The July wages and salaries brought the industry's total payroll for the year above the billion-dollar mark, to $1,121,808,000.

• **STEEL OUTPUT**—In the first 8 months of 1947, the steel industry produced 55,843,104 net tons of steel ingots and castings, says the American Iron & Steel Institute. Production in the first 8 months of this year was almost 15 million tons larger than the 40,877,126 net tons of ingots and steel for castings produced in the similar interval of 1946. August steel operations, averaging 90.2 pct of capacity, resulted in the production of 6,989,297 net tons of steel, more than 400,000 tons greater than the 6,570,154 tons produced in July and slightly above the 6,924,522 tons produced in August, 1946.

• **REAL EARNINGS UP**—June 1947 was the sixteenth consecutive month in which the average hourly earnings—actual and "real"—of production and related workers reached a new high, according to the National Industrial Conference Board's monthly survey of 25 manufacturing industries. The latest average of $1.346 was 1.3 pct greater than the previous month, and represented an increase of 13.2 pct since June 1946. "Real" weekly earnings, or actual earnings adjusted for changes in the consumers' price index in terms of 1923 dollars, rose 0.5 pct from May to June. Over the year since last June, "real" weekly earnings have declined 0.9 pct.

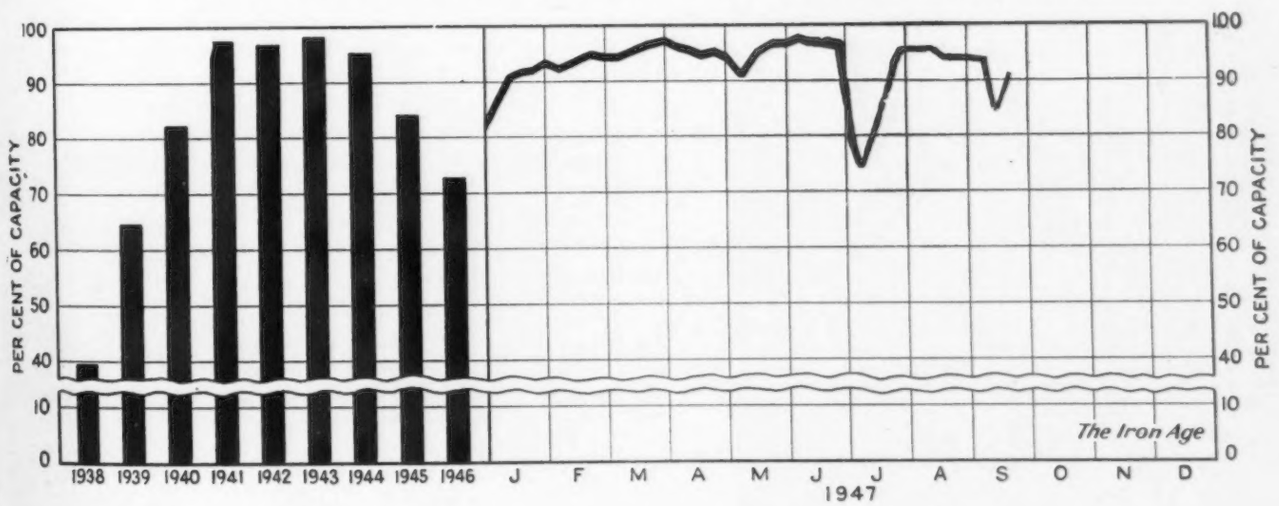
• **COKE AVAILABLE**—Beehive coke may shortly be a drug on the Chicago market. An organization in Chicago has been offering two to three cars a week of machine or hand drawn quality beehive coke. Forty foundries in this area were canvassed and very few expressed any interest. The coke firm delivers into Chicago from Virginia at about $5 over THE IRON AGE price. Evidently the supply of coke is much improved over 6 months ago or the shortage of coke has been somewhat exaggerated. Foundries here have paid as high as $57.00 per gross ton for out of district pig iron in the past month which also indicates that iron is in much shorter demand than coke.

• **STRIKE COST**—The 8-day strike of operating employees of Union R. R., U. S. Steel Corp. subsidiary, will have cost Carnegie-Illinois Steel Corp. approximately 260,000 tons of steel ingot production by the time operations are back to normal at the end of this week. Pig iron loss is estimated at 180,000 tons. Workers forced out by the strike, which ended Sept. 13, lost about $2 million in wages and the loss in production and wages to the corporation's steel and iron customers will be felt for weeks to come.

• **CONSUMER BUYS PLATE MILL**—International Detrola Corp. has bought the 84 in. sheared plate mill no longer in use by Lukens Steel Co. at its Coatesville, Pa., plant. The mill, together with supplementary roughing and finishing mills and equipment, will be removed and shipped to the former Andrews Steel Co. plant at Newport, Ky., now operated by International Detrola.

• **NEW ENGLAND PIG IRON**—Foundries that signed with the Mystic Iron Works for the remainder of 1947 and longer are thanking their stars they did so, although at the time the agreed price appeared rather high. They are the only ones that are getting supplies of iron regularly; not much; but sufficient to keep them going. It has been a long time since the big melters have been able to accumulate the backlogs they did prior to World War II.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
September 9	60.0*	93.0*	89.0	94.0	91.0*	102.0	90.0	99.0	99.5*	97.0	96.0	82.0	94.0	84.5*
September 16	81.5	93.0	89.0	94.0	96.0	102.0	100.0	100.0	100.5	109.0	105.0	82.0	94.0	90.5

* Revised.

Save machining time, produce accurate parts

With J&L Precision Ground Cold Finished Steel

The size accuracy and surface finish of J&L Precision Ground Cold Finished Steel is used to advantage by many manufacturers in machining parts. They find it eliminates part of the machining operation, saves tool wear and tool changes. J&L Precision Ground is available in a wide range of grades in sizes ¼" and larger from mill or your nearest J&L warehouse or distributor.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PA.

Gray Market Seen As Large Factor to Certain Users

New York

• • • **Approximately** 4.3 pct of the nation's finished steel supply is at present moving in the black market, according to a survey made recently by THE IRON AGE. Despite the unhealthy moral connotations involved in admitting participation in the gray market, 29 pct of the 1500 companies which received questionnaires made replies.

Perhaps even more significant than the amount of steel moving in the gray market are the opinions held by steel buyers on the responsibility for the existence of the gray market. Thus, although it may theoretically be possible for the steel industry to prove that it is not responsible for the gray market, the fact that

Many Buyers Continually Use Market to Keep Output At High Levels

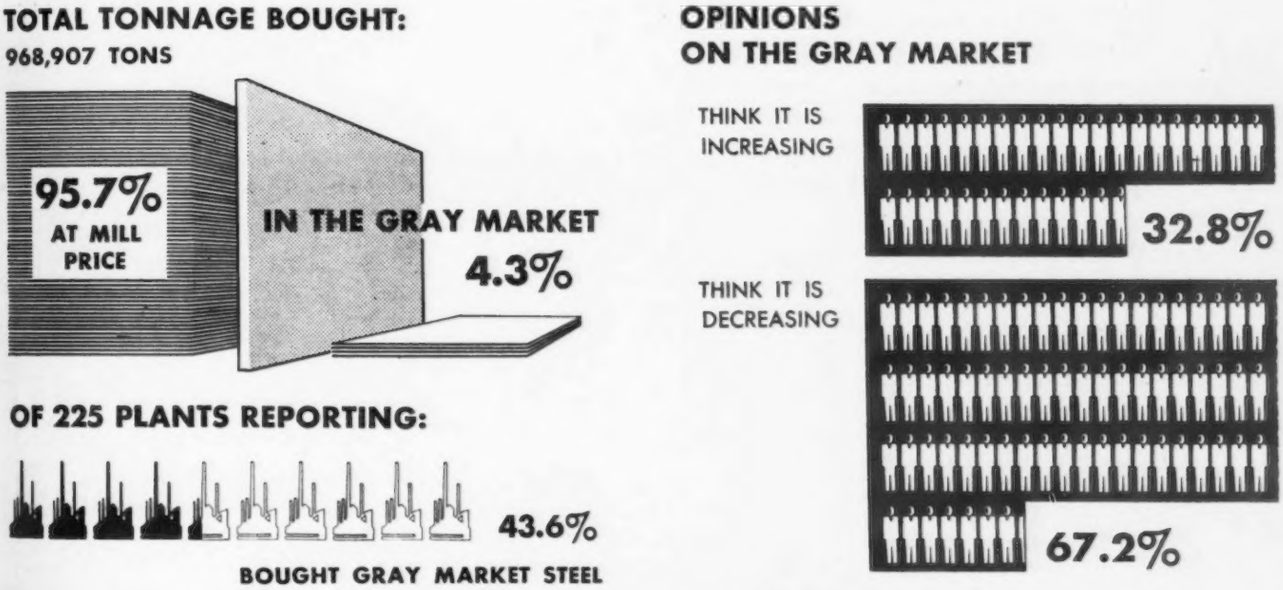
o o o

of the purchasing agents who answered this question, 161 think that the steel industry is responsible will probably remain in their minds for years to come, probably long after the steel shortage is over.

The survey conducted by mail late in August and early in September covered representative groups of steel consuming industries—those buying sheet steel, ranging from $50,000 capitalization up. The questionnaire was directed to purchasing agents, and in addition to this sampling, a number of personal calls were made by IRON AGE editors to verify results.

The establishment of historical precedent by the steel companies in determining allocations of steel has, according to some purchasing agents, resulted in a caste system among steel consumers. There are the Brahmins, those fortunate consumers who have bought directly from one or more mills in large tonnages for many years before the war, and whose business has not expanded to call for additional tonnages now over their prewar averages.

Today most of them have adequate allocations from their old suppliers. The next level in the



social scale are those companies which have an allocation from a mill, but due to an expansion in their business over prewar levels, have to go to warehouses or the gray market for additional tonnages, if they are to be had.

Another less fortunate group, which bought in small tonnages from warehouses, is finding frequently that limited inventories in the warehouses today are leaving them no alternative but to restrict output or buy in the gray market.

And then there are the "untouchables," the unfortunate new companies, who have no mill allocations, no established warehouse contact, and must lean heavily on the gray market for all or nearly all of their steel supplies.

These class distinctions are fairly hard lines. The allocation system has resulted, since the shortage began in about October 1945, in the creation of a desperation class of customers. With the steel shortage showing no signs of abatement, these steel users can see no future prospects of getting on mills' schedules.

Most consumers fall somewhere between the extremes. Few companies actually have all the steel they could possibly use. Those companies which are left completely out in the cold constitute a voluble minority in the returns from the survey, as well as in Washington steel hearings. While the steel companies have been able to take care of some newcomers, they are able to only when surplus tonnages are available.

Although far more replies indicated that the steel gray market was declining in importance than the opposite, it appears definite that, at least in some sections of the country, the gray market in flat-rolled products is becoming more and more important.

In the Chicago area, as of 10 days ago, the going gray market price for 18 to 22 gage hot-rolled sheets varied between $240 and $260 per ton. Varying widely with different types of "deals" and the obscure factors involved which affect prices, the spread of prices in the gray market as indicated in the survey is somewhat below the peaks hit in early newspaper accounts of the existence of the gray market. Of the tonnages purchased in the gray market and described in the returns from the survey, more than half was bought at premiums of more than $100 per ton above the published mill price. Slightly less than half was purchased at from $60 to $100 premium.

The gray market itself is becoming a more substantial, less ethereal business. Brokers who are asking 10¢ per lb for steel and can deliver are establishing reputations, while those who can't deliver are finding things tough.

Naturally, some operators are showing more energy and ingenuity than others. In the Midwest, one firm is systematically canvassing steel users all over the country for unused inventories. If the price is low enough, the operator buys the stock outright, but if the price is too high for even the gray market operator to feel safe, he offers to include it in his listing of steel available. This operator gets out two lists at frequent intervals, one containing lots of steel which he has on hand, and another material which he can obtain.

This firm has established for

Comments on Surveys . . .

• • • Comment from the steel consumers on the gray market was varied and often bitter. Some samples follow . . .

• "The blame for the gray market varies upon who is doing the accusing . . . Here in this area we know that there has been trading sheet steel for scrap which has set up several large junk dealers in the steel warehousing business at the gray market level."

• "I do not know the steel producer's problems, nor the extent to which exports make it impossible to buy steel through normal channels. I do know that the buyer has a life or death choice. His choice is to pay excessive prices for steel, or to close his plant."

• "Much ado about nothing."

• "We use 2000 tons per month and buy from mills only—we are content to operate on a 60 pct basis—rather than pay a bonus for steel."

• "The mills are taking care of us."

• "Blame for the gray market lies in the steel producers, who, because of the historical quota system which they follow are producing a class of desperation customers who have no hope whatsoever of securing any material whatsoever legitimately during the shortage."

• "We purchased in excess of 56,000 tons of steel in 3½ years during the war at $90 per ton. Today we are paying out as much as $25,000 per month premium for black market steel. No steel company has accepted an order from us since the war ended . . ."

• "The steel mills have a carefully planned perpetual shortage on steel and that they have no intentions of doing anything which might eliminate this shortage."

• "Disgusting."

• "Three ingot producers, ..., ..., and ..... ask a higher price for ingots than the published price of sheet steel."

• "We would be out of business if unable to purchase gray market steel."

• "Producers have not tried too hard to control or check ultimate usage."

• "We have 2-year old orders with ..... and can't get a pound from them but can buy their angles in the gray market by the carload anytime."

CONSUMER SURVEY: *To 1500 typical steel consumers* THE IRON AGE *sent brief questionnaire. To the victims, the gray market in steel is the hottest question of the day.*

o o o

1. How many tons of your past 6 months' steel purchases were at prices sufficiently above mill prices to be termed "gray market" steel? 5700 Total 6 mos. steel purchases 27,000 T
2. Roughly, how much per ton above the mill price are you paying for this material? 7%
3. Generalizing, what would you say as to the importance of the gray market in steel buying? Increasing Yes Declining
4. Whom would you say is primarily to blame for the gray market? Buyers ____ Exporters ____ Steel Producers Yes
5. Remarks: Above limited entirely to sheet steel. Additional finishing capacity necessary to correct.

itself a solid reputation, being able to deliver substantially whatever it offers. It sells to anyone, other brokers, or consumers. If the firm sells to other brokers, they usually add $5 per ton for their fee in the operation.

Few indications were received that the very large steel consumers are buying directly in the gray market, although some are doing so. Where they are able to inspect the steel in advance, several big firms are buying their steel wherever they can find it. Some brokers recently have been offering fair-sized tonnages to be delivered regularly over the period of a year, but information on this type of transaction is limited.

The larger firms who need steel beyond their mill allocations are more frequently entering into one of the now famous "conversion" deals, rather than buying directly in the gray market. Small independent steel producers, frequently making ingots in otherwise idle electric steelmaking capacity, are usually the first step in such transactions. The growing trend among steel consumers to ask their customers to furnish their own steel if they want their share of production has added bullish pressure to the comparatively small tonnage available from this source.

Although primary steel producers have emphasized repeatedly that they are having no part of the black market, there remains considerable doubt in the minds of the consumers who are suffering. To date, no steel company has come out with a detailed statement describing a program undertaken to eliminate the black market, and the results of that program.

The steel sales world is full of stories concerning tie-in sales of steel sheets to scrap dealers in return for shipments, and a few of these operations have been verified, but this trend is almost impossible to analyze quantitatively. A number of buyers of gray steel have reported in the survey that the shipments came wrapped for export, contributing to the strength of the theory that some tonnages intended for export are finding their way into consuming plants in this country.

Of the 225 companies completely

BIG BUSINESS: *No fly by night—can't deliver the steel—birds are these. This enterprising outfit has made a reputation among "surplus" steel dealers of being able to deliver the goods. The top list is steel in their warehouse—the bottom list covers lots on which the asking price is so high that these operators are afraid of the risk—they will handle on commission.*

IMMEDIATE DELIVERY

WHITE LIST #310

ITEM NO.	WEIGHT IN LBS.	GAUGE	SIZE	QUALITY	F.O.B. POINT	PRICE PER LB.
			SHEETS			
5	4517	14	18" x 72"	Norm. HR 4130	"	.06
6	6183	14	18" x 72"	CR 4130	"	.07
7	13810	13	18" x 72"	HR	"	.08
8	22,000	13	30" x 60" & larger	HRPO	"	.08½
9	5000	12	18" x 72"	HR	"	.08
10	2100	11	22" x 60"	HR	"	.08
11	3000	10	16 5/8" x 72"	HR	"	.08
12	3940	10	20 9/16" x 72"	HR	"	.08
13	4060	10	22½" x 72"	HR		

ALL ITEMS ON THIS LIST ARE AVAILABLE TO US BUT NOT OWNED BY US. WE CONSIDER THE PRICES ASKED TO BE TOO HIGH TO ALLOW US TO STOCK IN OUR WAREHOUSE.. HOWEVER, WE LIST THIS STEEL AS A SERVICE TO OUR CUSTOMERS.

ITEM NO.	WEIGHT IN LBS.	GAGE	SIZE	QUALITY	F.O.B. POINT	PRICE PER LB.
			SHEETS			
22	4,400	14	25" x 96"	HR	"	.09½
23	12,170	14	26"-36" x 60-100"	HRPO	"	.09½
24	6,680	14	23" x 96"	HR	"	.09½
25	31,000	14	36" x 90"	HRPO	"	.10½
26	4,480	14	24" x 96"	HR	"	.10
27	56,000	14	36" x 60½"	HRPO	"	.10½
28	2,220	13	32" x 100"	HRPO		

answering the question on tonnages of steel bought, 43.6 pct reported that they had bought in the gray market. This percentage may be a deceptively high figure, due to the fact that these buyers may be much more interested in answering such a questionnaire than would other firms which have adequate supplies and are too busy to be bothered.

The gray market, then, from a tonnage period, is small, but to a specific group of consumers, it is a serious ever-present problem, offering no alternative but to curtail production. There is still another group which, because steel costs are so great a portion of the cost of their finished product, are unable to turn even to the gray market for relief from the steel shortage.

Senator Martin May Be Ready to Shift Inquiry to Joint Body

Washington

• • • **Senator Martin's** steel subcommittee, although reported to be getting ready to unload the capacity expansion question on the Joint Senate-House Economic Committee, is being very careful not to tip its hand just yet.

The Pennsylvania legislator told THE IRON AGE last week at the conclusion of what he termed a "town meeting of leading producers" that the question of congressional recommendation to the industry would have to be taken up by his Senate Small Business subcommittee at a later date.

The subcommittee will release early in January, through Senator Wherry's Small Business Committee, a full report on its seven-month investigation. An interim report will be published later this fall after members of the subcommittee return from European trips. It is considered doubtful that either report will present recommendations for industry expansion of steel-making capacity.

Senator Martin told top officials of 12 leading concerns last week that "if evils like the steel gray market and other abuses do not end, don't be surprised when Uncle Sam moves in as a traffic cop." Testimony presented to the subcommittee, he said, indicates that more than 2 million tons of steel have been diverted into the gray market this year.

Supply will be equal to demand in the domestic market within two years, Benjamin F. Fairless, president of United States Steel Corp., predicted in answer to a request for industry estimates from Senator Martin. Eugene Grace, chairman of the Bethlehem Steel Corp., added his own prediction that a two-year period would take care of both domestic and export demands.

Fairless, Grace See Shortage Over in 2 Years; Senator Threatens Control

By GEORGE H. BAKER
Washington Bureau

o o o

Denouncing claims that the industry has done nothing to end the present gray market, Mr. Fairless said U. S. Steel has "tried to prevent any of its steel moving in improper channels. We believe we have had good success. If this committee will point to any specific case involving U. S. Steel, I assure you that the matter will be corrected promptly," he declared.

Mr. Grace branded as false current reports that the industry has conspired to bring about "an economy of scarcity." He stated that Bethlehem's planned expenditure for increased capacity is $250 million, which is expected to add 800,000 tons to its ingot capacity. Flat rolled facilities with an annual capacity of 2 million tons are planned, he said.

Substantial increase of present capacity "would contribute nothing but further inflation," T. M. Girdler, chairman of Republic Steel Corp., told Senator Martin. "I believe that the people of our country will be far better off five years from now for having endured for a little while longer the necessary, but not very serious, privations of getting along with a few less new cars, a few less refrigerators, and a few less stoves. Such a course is our best defense against breadlines, relief and Communism," he added.

Ben Moreell, chairman of Jones & Laughlin Steel Corp., presented the position of the American Iron & Steel Institute at the meeting. He reiterated the view of President Walter Tower that "as late as 1940, prominent labor leaders, Government economists, members of the Temporary National Economic Committee, and others were complaining that the steel industry was contributing dangerously to technological unemployment through excessive modernization of equipment."

Present shortages he said, are "largely due to abnormal conditions." He listed these as: (1) pent-up demand for consumer goods (2) steel and coal strikes (3) strikes in industries supplying the steel industry. He warned that full-scale operation and planned expansion require "uninterrupted production and a steady flow of the raw materials essential in steelmaking."

Industry members who attended the meeting included Mr. Fairless, Mr. Grace, Mr. Girdler, Mr. Moreell, Frank Purnell, George R. Fink, Wilfred Sykes, H. H. Sebald, Henry A. Roemer, Archie J. McFarland, Hiland G. Batcheller and Newell H. Orr.

Meanwhile, the steel subcommittee is studying a recommendation of the CIO United Steelworkers that the government take immediate action to bring about capacity expansion.

Otis Brubaker, CIO director of research, testified in a committee hearing that "some immediate action on the part of the government is required if we are to be in a position to support our domestic economy and to fulfill the commitments which we have made and are in the process of making elsewhere in the world."

This "immediate action," Mr.

(CONTINUED ON PAGE 116)

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1947

(Preliminary)

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production, all companies (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,544,841	95.1	384,096	87.7	284,309	65.9	7,213,246	93.0	1,628,272	4.43
February	5,830,371	93.8	314,912	79.6	276,779	71.1	6,422,062	91.7	1,605,515	4.00
March	6,614,369	96.1	378,893	86.5	314,224	72.9	7,307,486	94.3	1,649,545	4.43
1st Quarter	*18,989,581*	*95.0*	*1,077,901*	*84.8*	*875,312*	*69.9*	*20,942,794*	*93.1*	*1,628,522*	*12.86*
April	6,360,600	95.4	375,675	88.6	306,422	73.4	7,042,697	93.8	1,641,654	4.29
May	6,634,716	96.4	372,878	85.2	321,903	74.6	7,329,497	94.5	1,654,514	4.43
June	6,312,674	94.7	351,247	82.8	304,744	73.0	6,968,665	92.8	1,624,397	4.29
2nd Quarter	*19,307,990*	*95.5*	*1,099,800*	*85.5*	*933,069*	*73.7*	*21,340,859*	*93.7*	*1,640,343*	*13.01*
1st 6 Months	*38,297,571*	*95.3*	*2,177,701*	*85.2*	*1,808,381*	*71.8*	*42,283,653*	*93.4*	*1,634,467*	*25.87*
* July	6,028,707	87.8	256,125	58.6	285,322	66.3	6,570,154	84.9	1,486,460	4.42
† August	6,329,796	92.0	346,033	79.0	313,468	72.7	6,989,297	90.2	1,577,719	4.43
September										4.28
3rd Quarter										*13.13*
9 months										*39.00*
October										4.43
November										4.29
December										4.42
4th Quarter										*13.14*
2nd 6 months										*26.27*
Total										52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 net tons Bessemer and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of January 1, 1947 as follows: Open hearth 81,010,990 net tons, Bessemer 5,154,000 net tons, Electric 5,076,240 net tons, total 91,241,230 net tons.

* Revised
† Preliminary figures, subject to revision.

YEAR 1946

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		*Calculated weekly production, all companies (Net tons)	Number of weeks in month
	*Net tons	Percent of capacity	Net tons	Percent of capacity	*Net tons	*Percent of capacity	*Net tons	Percent of capacity		
January	3,530,192	51.1	207,512	47.4	135,183	28.9	3,872,887	49.6	874,241	4.43
February	1,301,719	20.9	25,905	6.6	65,058	15.4	1,392,682	19.8	348,171	4.00
March	5,950,241	86.2	363,949	83.1	194,574	41.6	6,508,764	83.3	1,469,247	4.43
1st Quarter	*10,782,152*	*53.8*	*597,366*	*47.0*	*394,815*	*29.1*	*11,774,333*	*51.9*	*915,578*	*12.86*
April	5,336,317	79.8	286,088	67.5	238,790	52.8	5,861,195	77.5	1,366,246	4.29
May	3,702,184	53.6	153,409	35.0	217,027	46.4	4,072,620	52.2	919,327	4.43
June	5,148,660	77.0	251,253	59.2	225,860	49.9	5,625,773	74.4	1,311,369	4.29
2nd Quarter	*14,187,161*	*69.9*	*690,750*	*53.7*	*681,677*	*49.7*	*15,559,588*	*67.9*	*1,195,971*	*13.01*
1st 6 months	*24,969,313*	*61.9*	*1,288,116*	*50.4*	*1,076,492*	*39.4*	*27,333,921*	*59.9*	*1,056,588*	*25.87*
July	6,027,388	87.5	365,332	83.6	225,963	48.5	6,618,683	84.9	1,497,440	4.42
August	6,291,363	91.1	373,837	85.4	259,322	55.5	6,924,522	88.7	1,563,098	4.43
September	5,951,232	89.2	371,465	87.8	232,869	51.6	6,555,566	86.9	1,531,674	4.28
3rd Quarter	*18,269,983*	*89.3*	*1,110,634*	*85.6*	*718,154*	*51.8*	*20,098,771*	*86.8*	*1,530,752*	*13.13*
9 months	*43,239,296*	*71.1*	*2,398,750*	*62.2*	*1,794,646*	*43.6*	*47,432,692*	*69.0*	*1,216,223*	*39.00*
October	6,312,604	91.4	387,933	88.6	251,205	53.8	6,951,742	89.0	1,569,242	4.43
November	5,873,264	87.8	318,350	75.1	266,157	58.8	6,457,771	85.4	1,505,308	4.29
December	5,286,799	76.7	222,704	51.0	250,998	53.8	5,760,501	73.9	1,303,281	4.42
4th Quarter	*17,472,667*	*85.3*	*928,987*	*71.5*	*768,360*	*55.4*	*19,170,014*	*82.8*	*1,458,905*	*13.14*
2nd 6 months	*35,742,650*	*87.3*	*2,039,621*	*78.5*	*1,486,514*	*53.6*	*39,268,785*	*84.8*	*1,494,815*	*26.27*
Total	60,711,963	74.7	3,327,737	64.6	2,563,006	46.6	66,602,706	72.5	1,277,382	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons Bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of January 1, 1946 as follows: Open hearth 81,236,250 net tons, Bessemer 5,154,000 net tons, Electric 5,500,290 net tons, total 91,890,540 net tons.

* Revised January through December, 1946.

(CONTINUED FROM PAGE 114)

Brubaker said, could be in the form of long-term, low interest loans from the Reconstruction Finance Corp. or government guaranteed market plans. If the industry still is unwilling to proceed under such arrangements, Mr. Brubaker said, "there is no alternative except for the government itself to build or lease the necessary facilities."

Mr. Brubaker testified that all forecasts of future steel needs, with the exception of the industry view, "clearly indicate a continuing domestic shortage, even if steel exports are held to a bare minimum." He cited arguments presented by the Bureau of Labor Statistics; Louis H. Bean, Agriculture Dept. economist; the Commerce Dept.; the Twentieth Century Fund; Homer Zopf, steel subcommittee consultant; and Senator Martin.

Citing estimates presented in THE IRON AGE (July 17, p 95) on German steel requirements, Mr. Brubaker contrasted the estimated need of 14 million tons per year with a present ceiling of 5.8 million metric tons of German production. "Even if we assume, however, that dispute over rebuilding Germany's economy will not be settled for many months or years, and even if we assume that no steel will be exported to Germany or Russia or to the countries within Russia's orbit, Western Europe's steel needs during the next 12 months, according to THE IRON AGE, will still be between 7,700,000 and 9,540,000 ingot tons," Mr. Brubaker stated.

Mr. Brubaker criticized the stand taken by Wilfred Sykes, president of Inland Steel, that "the present market for steel will be saturated by the end of 1947," as the CIO economist put it. "I don't think any other producer is so rash as to agree to this," Mr. Brubaker declared, adding that if the industry proves itself inequal to supplying needs, the industry "will be directly responsible for introducing a real element of instability in our economy."

"We sympathize with the companies' fears, but they must not be permitted to stand in the way of

AMERICAN IRON AND STEEL INSTITUTE
SHIPMENTS OF STEEL PRODUCTS
ALL GRADES INCLUDING ALLOY AND STAINLESS
(Net Tons)

JULY - 1947
Month

Steel Products	Number of companies	Items	Current Month: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Current Month: Per cent of Total Shipments	Current Month: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	To Date This Year: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	To Date This Year: Per cent of Total Shipments	To Date This Year: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Whole Year 1946: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products For Resale) (Net Tons)	Whole Year 1946: Per cent of Total Shipments	Whole Year 1946: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	41	1	312,212	6.3	141,685	1,638,174	4.5	1,265,270	1,949,624	4.0	1,645,748
Structural shapes (heavy)	13	2	357,317	7.2	131	2,581,380	7.1	1,938	3,474,284	7.1	5,398
Steel piling	3	3	26,891	0.5	-	187,651	0.5	23	205,313	0.4	141
Plates (sheared and universal)	29	4	464,214	9.3	14,867	*3,618,656	10.0	124,127	4,152,181	8.5	250,709
Skelp	6	5	6,492	0.1	28,168	92,766	0.3	223,583	227,033	0.5	194,666
Rails—Standard (over 60 lbs.)	4	6	176,870	3.6	200	1,294,052	3.6	662	1,790,311	3.7	4,890
—All other	5	7	22,607	0.4	100	118,517	0.3	267	144,999	0.3	426
Joint bars	7	8	14,382	0.3	1,456	106,662	0.3	9,015	176,803	0.4	5,327
Tie plates	8	9	43,116	0.9	408	296,987	0.8	3,385	447,496	0.9	18,700
Track spikes	8	10	13,180	0.3	-	102,953	0.3	74	146,194	0.3	693
Hot Rolled Bars—Carbon	33	11	493,323	9.9	55,123	*3,659,336	10.1	454,010	5,006,859	10.3	707,991
—Reinforcing—New billet	16	12	102,041	2.1	1,171	719,287	2.0	5,474	1,048,483	2.1	7,381
—Rerolled	11	13	17,197	0.3	-	* 94,074	0.3	-	141,346	0.3	1,267
—Alloy	27	14	127,524	2.6	17,081	1,039,806	2.9	127,592	1,390,278	2.8	138,395
—TOTAL	45	15	740,085	14.9	73,375	*5,512,503	15.3	587,076	7,586,966	15.5	855,034
Cold Finished Bars—Carbon	29	16	108,107	2.2	871	897,060	2.5	5,363	1,316,579	2.7	2,428
—Alloy	26	17	14,671	0.3	211	142,247	0.4	1,113	196,237	0.4	1,725
—TOTAL	35	18	122,778	2.5	1,082	1,039,307	2.9	6,476	1,512,816	3.1	4,153
Tool steel bars	19	19	5,161	0.1	453	53,250	0.1	3,203	96,020	0.2	371
Pipe & Tubes—Butt-weld	15	20	128,558	2.6	5,576	962,295	2.7	38,200	1,276,289	2.6	45,393
—Lap weld	8	21	27,797	0.6	21	228,285	0.6	679	305,516	0.6	238
—Electric weld	11	22	96,865	1.9	23	595,894	1.6	1,013	674,459	1.4	591
—Seamless	10	23	161,842	3.2	7,840	1,210,401	3.3	81,686	1,871,540	3.8	83,441
—Conduit	7	24	13,600	0.3	578	83,878	0.2	4,877	98,521	0.2	2,448
—Mechanical and pressure tubing	13	25	51,051	1.0	1,537	380,187	1.1	11,831	429,180	0.9	3,478
Wire rods	22	26	47,187	0.9	26,235	* 377,534	1.0	188,700	679,998	1.4	346,506
Wire—Drawn	39	27	175,530	3.5	13,823	*1,465,126	4.1	105,165	1,933,124	4.0	135,592
—Nails and staples	18	28	55,640	1.1	652	483,120	1.3	4,762	636,632	1.3	797
—Barbed and twisted	15	29	18,515	0.4	12	143,663	0.4	36	207,610	0.4	-
—Woven wire fence	13	30	28,654	0.6	251	237,433	0.7	2,125	383,230	0.8	-
—Bale ties	12	31	9,449	0.2	-	71,545	0.2	-	99,993	0.2	-
Black Plate—Ordinary	9	32	63,363	1.3	168	477,445	1.3	1,610	781,167	1.6	3,179
—Chemically treated	8	33	761	-	-	15,583	-	-	125,170	0:3	-
Tin and Terne Plate—Hot dipped	9	34	184,562	3.7	-	1,151,813	3.2	228	1,924,657	3.9	-
—Electrolytic	9	35	138,947	2.8	-	872,728	2.4	529	909,173	1.9	-
Sheets—Hot rolled	30	36	561,023	11.3	47,688	4,135,722	11.4	343,958	5,521,463	11.3	421,198
—Cold rolled	17	37	441,294	8.9	1,877	3,128,721	8.7	14,490	4,075,554	8.4	3,397
—Galvanized	16	38	131,373	2.6	22	923,175	2.6	214	1,462,053	3.0	1,725
—Electrical and enameling	10	39	47,780	1.0	78	333,374	0.9	385	435,170	0.9	-
Strip—Hot rolled	23	40	131,446	2.6	20,946	1,000,152	2.8	165,904	1,363,812	2.8	237,176
—Cold rolled	34	41	115,878	2.3	2,128	928,942	2.6	16,554	1,282,146	2.6	25,904
Wheels (car, rolled steel)	5	42	24,380	0.5	-	211,712	0.6	2	252,308	0.5	348
Axles	5	43	13,766	0.3	-	103,794	0.3	53	130,461	0.3	221
All other	-	44	-	-	-	-	-	-	6,266	-	-
TOTAL STEEL PRODUCTS	141	45	4,974,566	100.0	391,380	*36,165,380	100.0	3,208,100	48,775,532	100.0	4,297,889

During 1946 the companies included above represented 99.5 % of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Adjusted.

capacity expansion," Mr. Brubaker said. Admitting that the cost of expansion is "tremendous," he stated that such costs could be met "by the industry from present working capital, from its current high profit margins, and from capital borrowing."

As the CIO's solution to present shortages, Mr. Brubaker asked the Senate Small Business Committee to take the following steps:

(1) Find out if the industry is unanimous in its stand against capacity expansion.

(2) Intercede with industry representatives to change their views on expansion.

(3) File a committee report presenting the need for legislative action.

(4) Request the President to coordinate studies of government agencies on future steel needs. This will be necessary later in the light of the Marshall Plan, according to Mr. Brubaker.

(5) Bring about a declaration of government policy on expansion goals.

(6) Ask the President, if positive results are not forthcoming in a year, to call together industry, labor and government to draw up a joint program for expansion.

Okays Importing Scrap From Overseas Bases

Washington

• • • **Stocks of surplus** metal scrap located at overseas bases may continue to be imported into the United States after Oct. 1, the State Dept. ruled last week.

D. H. Connolly, the department's foreign liquidation commissioner, paved the way for continued imports of scrap by amending FLC Regulation 8 on Sept. 9. Scrap imports otherwise would have been prohibited after Oct. 1, due to FLC's ruling that surplus items at overseas bases may not be brought back to the U. S. in the same form in which they were exported.

FLC regulations now provide that government surplus goods sold in foreign areas may be imported into the U. S. only under the following conditions:

(1) If sold primarily as scrap and brought back for such use.

(2) For reconditioning for reexport.

(3) By veterans or members of the armed forces for their own personal use.

(4) If a part of Canol No. 1 Project, in which case reimportation is permitted until Mar. 1, 1948.

Spang-Chalfant Buys Bloom Heating Furnace

Pittsburgh

• • • **A new continuous** bloom heating furnace with a capacity of 60 tons an hour will be constructed for Spang-Chalfant division of National Supply Co. at Ambridge, Pa., by Rust Furnace Co.

The 70 ft. triple-fired, zone controlled, end charged, end discharged furnace will replace old equipment. This new furnace is in addition to a 100-ton furnace, one of the largest ever to be built for a tube mill, to be constructed by Rust at Ambridge under a contract previously announced.

Steel Export Requests Due

Washington

• • • **Applications for** export licenses regulating shipment of iron and steel products in the fourth quarter of 1947 must be submitted to the Office of International Trade on or before Oct. 1, OIT announced in Export Bulletin No. 417.

Although iron and steel products will be subject to OIT's individual license procedure after Oct. 1, holders of consolidated licenses may continue to export against such licenses until the full amount licensed has been shipped or until the validity period of the license expires, OIT said. Details of the revised license procedure were presented in THE IRON AGE, Aug. 14, p. 149.

50 YEARS AGO

The Iron Age, Sept. 16, 1897

• A new process developed to finish shafting, bronze rods and tubing by the Brightman Mfg. Co., Millersburg, Ohio, makes possible the turning of from 1200 to 1500 ft of 2-in. shafting per day.

• "It has taken some time for the Chicago Flexible Shaft Co. to get settled in their new quarters in Chicago. Everything is running smoothly now and preparations are complete for the large increase in trade expected this winter."

• We have been officially advised that the accounts of extensive improvements made at the Homestead Steel Works of the Carnegie Steel Co. have been greatly exaggerated. About the only addition at this time is the building of ten 40-ton open-hearth furnaces.

• The Knapp roller boat which is in the shape of a large steel cylinder was launched recently and is expected to cross the ocean in 48 hr. The craft is designed to roll across the water, the outer cylinder being fitted with paddles. An inner cylinder carrying boilers and crew remains stationary."

• The British Trades Union Congress which met last week at Birmingham unanimously adopted a resolution to demand from the Government the abolition of child labor in factories under the age of 15 and of all night labor under the age of 18.

• NEWS ITEM — "The crowded condition of the New York streets is a good indication of business revival."

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

2960 Tons, San Mateo County, Calif., superstructures and approaches for four Bayshore Freeway overcrossings between South San Francisco and Burlingame, through Carrico & Gautier to Bethlehem Pacific Coast Steel Corp., San Francisco.

1800 Tons, Fresno, Calif., Veterans Administration Hospital, through James I. Barnes Construction Co. to Union Steel Co.

800 Tons, Chicago, 130th St. Bridge through City of Chicago to Bethlehem Steel Co., Bethlehem.

780 Tons, Kern County Calif., bridges and overhead structures across Tehachapi Creek and S. P. RR. tracks, through Guy F. Atkinson Co. to National Iron Works, San Diego.

600 Tons, Bristol, Pa., Seaboard Container Corp., manufacturing building, to Bethlehem Steel Co., Bethlehem.

280 Tons, Buffalo, N. Y., additions to University of Buffalo School of Engineering, to R. S. McManus Steel Construction Co., Buffalo, through the John W. Cowper Co., Inc., general contractors.

250 Tons, Cheektowaga, N. Y., new plant for U. S. Rubber Reclaiming Co., to August Feine & Sons Co. Inc., Buffalo, through Carpenter & Skaer, general contractors.

150 Tons, San Mateo County, Calif., overcrossings between South San Francisco and Colma Creek, through Guy F. Atkinson Co. to National Iron Works, San Diego.

110 Tons, Cheektowaga, N. Y., addition to Cleveland Hill School, to R. S. McManus Steel Construction Co., Buffalo, N. Y.

• • • **Fabricated steel inquiries** this week included the following:

2400 Tons, Wilmington, Del., E. I. du Pont de Nemours Co., experimental building, to be rebid, bids in.

1800 Tons, Hazleton, Pa., Electric Autolite Co., manufacturing building, due Sept. 26.

1500 Tons, Philadelphia, hangars, S. W. airport, City of Philadelphia, due Oct. 8.

1260 Tons, Boonville, Wyo., U. S. Bureau of Reclamation Spec. 1901 relocation of bridge for the Burlington R.R.

1000 Tons, Portland, Me., First National Stores Inc. unit; previously reported 600 tons.

910 Tons, Vermillion County, Iowa, truss span State Highway Dept. Section 34-Z-F. Illinois Steel Bridge Co. low bidder.

900 Tons, Tulsa, Okla., bridge on Highway No. 51 through U. S. Engineers. J. A. Rains, low bidder.

400 Tons, Harrisburg, Pa., Insurance office building, Penn Threshermens & Farmers Mutual Insurance Co., due Sept. 25.

380 Tons, Mendocino County, Calif., bridge at Navarro River near Albion, California Div. of Highways, Sacramento, bids to Oct. 8.

270 Tons, Lewis County, Wash., Cora bridge and approaches, P.S.H. 5, Director of Highways, Olympia, bids to Sept. 23.

210 Tons, Du Page County, Ill., bridge span State Highway Dept. Section 58-F and 58VP. Midland Structural Steel Co., low bidder.

210 Tons, Philadelphia, Penrose Ave. bridge substructure, Pennsylvania Dept. of Highways, due Oct. 10.

150 Tons, Pottsville, Pa., Pottsville Box Factory Co., box manufacturing plant, due Sept. 25.

150 Tons, Philadelphia, bridge over P, B & W R.R. at 70 St., City of Philadelphia, due Oct. 1.

140 Tons, Macoupin County, Ill., bridge span State Highway Dept. Section DX-SF. Bethlehem Steel Co., low bidder.

140 Tons, Jackson County, Ill., bridge span State Highway Dept. Section 11-F. Illinois Steel Bridge Co., low bidder.

• • • **Reinforcing bar awards** this week included the following:

2000 Tons, Arapahoe County Col., construction intake structure, conduit, etc., Cherry Creek, Denver District Corps of Engineers, Spec. 05-016-47-10, through Al Johnson Construction Co., to Carnegie-Illinois Steel Corp., Pittsburgh, and Colorado Fuel & Iron Corp., Denver.

800 Tons, Fresno, Calif., Veterans Administration Hospital, through James I. Barnes Construction Co. to Southwest Rolling Mills.

490 Tons, San Mateo County, Calif., superstructures and approaches for four Bayshore Freeway overcrossings between South San Francisco and Burlingame, through Carrico & Gautier, to Soule Steel Co., San Francisco.

400 Tons, Chicago, North shore intercepting sewer, sanitary district of Chicago, through Paschen Contractors Inc. to Dean Steel Co., Chicago.

250 Tons, Chicago, diesel shop for the Chicago and Northwestern R.R. S. N. Nielsen Co., low bidder.

200 Tons, Marshall County, Iowa, paving project State of Iowa. Atkinson Paving Co., Chillicothe, Mo., low bidder.

160 Tons, Kern County, Calif., bridges and overhead structure across Tehachapi Creek and S.P. RR. tracks, through Guy F. Atkinson Co. to Blue Diamond Corp., Los Angeles.

115 Tons, San Mateo County, Calif., overcrossings between South San Francisco and Colma Creek, through Guy F. Atkinson Co. to Soule Steel Co., San Francisco.

• • • **Reinforcing bar inquiries** this week included the following:

600 Tons, Miles City, Mont., veterans' hospital. Lease & Leland Co. previously reported as low bidder. All bids have now been rejected.

395 Tons, Los Angeles, undercrossing on Hollywood Parkway at Alvarado St., California Div. of Highways, Los Angeles, bids to Oct. 8.

115 Tons, Redding, Calif., bars for switchyard for Keswick power plant, Bureau of Reclamation, Denver, Spec. 1944, bids to Oct. 15.

• • • **Piling awards** this week included the following:

3600 Tons, Brownsville, Tex., bulk head wall Brownsville navigation district to Carnegie-Illinois Steel Co., Pittsburgh.

• • • **Railroad car awards** this week included the following:

St. Louis & San Francisco R.R. has ordered 1300 freight cars; 500 55-ton open top hopper cars from Pullman Standard Car Mfg. Co. at Bessemer, Ala., 300 50-ton box, P-S-1 from Pullman Standard Car Mfg. Co., Michigan City, 200 70-ton covered hopper cars and 300 55-ton hoppers from the Pressed Steel Car Co., Mt. Vernon, Ohio. The Delaware Lackawanna R.R. has ordered from American Car & Foundry for delivery first quarter 1948 500 50-ton box cars. The Chicago, Indianapolis & Louisville R.R. has ordered 50 70-ton gondolas from the Greenville Steel Car Co. and 300 50-ton high side gondolas from Pullman Standard Car Mfg. Co.

Coming Events

Sept. 17-26 National Machine Tool Builders' Assn., machine tool show, Dodge-Chicago Plant, Chicago.
Sept. 18-20 Foundry Equipment Manufacturers Assn., annual meeting, Hot Springs, Va.
Sept. 18-20 National Assn. of Foremen, annual convention, Los Angeles.
Sept. 22-25 Assn. of Iron & Steel Engineers, annual meeting, Pittsburgh.
Sept. 28-Oct. 3 American Institute of Mining and Metallurgical Engineers, regional meeting, Denver.
Oct. 2-3 Gray Iron Founders' Society, annual convention, Milwaukee.
Oct. 2-4 Society of Automotive Engineers, aeronautics meeting, Los Angeles.
Oct. 6-7 Packaging Machinery Manufacturers Institute, annual meeting, Springfield, Mass.
Oct. 6-8 American Gas Assn., annual convention, Cleveland.
Oct. 9-10 Porcelain Enamel Institute, annual meeting, Cleveland.
Oct. 16-17 National Conference on Industrial Hydraulics (formerly Hydraulics Machinery Conference), annual meeting, Chicago.
Oct. 18-24 National Metal Exposition, Chicago.
Oct. 20-21 Society of Automotive Engineers, production meeting, Cleveland.
Oct. 30-Nov. 1 American Society of Tool Engineers, semiannual meeting, Boston.
Oct. 31 Illinois Mining Institute, annual meeting, Springfield, Ill.
Nov. 7-8 Annual Conference on X-Ray and Electron Diffraction, Mellon Institute of Industrial Research, Pittsburgh.

3.5 Million Tons of Coal Scheduled for Europeans

Washington

• • • **Europe will receive** 3,500,000 tons of the four million tons of coal allocated for October export by the United States Coal Operating Committee. Ports of shipment will be designated so as to cause least impact on transportation facilities and domestic supplies. No exports of anthracite in larger size than buckwheat No. 1 will be authorized during October.

While November and December quotas are still open to determination, it is not expected that they will exceed the October figure. August shipment of five million tons was the highest to date this year.

Weekly Gallup Polls . . .

Seven Out of Ten Predict Wages Will Dip or Stand Pat

Princeton, N. J.

• • • **With the weight** of public opinion leaning toward the belief that prices in general are going to rise in the next half year, seven out of ten Americans see no relief in sight in the form of similar advances in general wage rates, according to George Gallup, director, American Institute of Public Opinion.

If the situation the public now foresees actually comes to pass, consumers will face a tighter squeeze on their incomes than they are now experiencing.

In its coast-to-coast survey of typical American families, the institute asked:

"Do you think wage rates, in general, will be higher, lower, or about the same A YEAR FROM NOW?"

	Pct
Lower	27
Same	44
Higher	18
No opinion	11

Breakdowns by occupations show only slight divergences from the national pattern. Members of labor unions are a little more optimistic to the extent that fewer of them than the general public, think that wage reductions are in the offing.

The wage earners may be too pessimistic in foreseeing a reduction in real wages, beset as they are at the moment by skyrocketing prices. Economic trends show that in the normal run of things prices break before wages. This is probably truer today than ever before because so many wages are set under labor-management contracts.

Further analysis reveals, however, that the public's ideas about the relation between prices and wages agree with the general economic theory on the subject. This is shown in the following table:

	Expect Higher Prices Pct	Expect Lower Prices Pct	Expect Prices Not to Change Pct
Think Wages Will Go			
Higher	34	4	9
Go Lower	20	44	24
Remain Same	37	44	57
No opinion	9	8	10

There is a progressive pattern in the percentage of people who think wages in general are due to go up, according to the size of their community:

	Farm Population Pct	Under 10,000 Pct	10,000 100,000 Pct	Over 100,000 Pct
Higher	13	18	19	21
Same	41	44	41	46
Lower	33	27	28	24
No opin.	13	11	12	9

More people in the northeast foresee wages moving upward than in other sections of the country, and fewest believe so in the South.

When it comes to the immediate future of dollar wages in the industry or business for which he works the average American sees things in a somewhat rosier hue. Institute interviewers asked:

"Do you think wage rates for the business you're (your husband is) in will be higher, lower, or about the same A YEAR FROM NOW?"

	Pct
Lower	15
Same	60
Higher	15
No opinion	10

When the question is posed on this personal level, the labor union member is inclined to be more optimistic than nonunion men and women, possibly because he has confidence in the ability of his union to maintain current wage rates. In any event, this is the way union members line up on the future of wage rates in their business:

	Pct
Lower	10
Same	65
Higher	19
No opinion	6

While consumers trying to make ends meet may be hard put to believe it, wages and incomes are still staying ahead of prices according to government figures. Bureau of Labor Statistics show that the weekly average wage in manufacturing industries in June, 1947, was 105 pct above the weekly average for the year 1939. Living costs, based on the Bureau of Labor Statistics price index, increased 59.3 pct from 1939 to June of this year.

•

• • • **Ten months before** the 1948 presidential nomination, three labor union members out of every four polled by the institute expressed a preference in candidates, while one fourth indicated no choice or no opinion.

Another Poll Shows Truman, Dewey, Wallace Most Popular Candidates of Union Members

o o o

President Truman is the most popular with those expressing a choice. Thomas E. Dewey is second and Henry A. Wallace third.

While an independent third party boom for Mr. Wallace is always a possibility—in fact he has himself continued to hint at a third party movement—institute survey figures do not indicate that he is winning very widespread support as a candidate at present among union members. In fact, Harold E. Stassen almost equals him in numerical support among the rank and file of labor union members.

The poll questioned a cross-section of union members as follows:

"What man would you like to see elected president of the United States in 1948?"

	Pct
Harry S. Truman	28
Thomas E. Dewey	14
Henry A. Wallace	7
Harold E. Stassen	6
Gen. Dwight Eisenhower	4
Gen. Douglas MacArthur	2
Arthur Vandenberg	2
Earl Warren	2
Robert A. Taft	1
Others	8
No choice	26
	100

In conducting the survey, interviewers used no check list of names to hand to voters; the answers to the question were all volunteered answers.

In the second part of the poll the labor union members were asked how they classified themselves politically—whether Democratic, Republican or Independent. Their candidate preferences were then analyzed on the basis of their answer to this question.

Those union members who classify themselves as Democrats pick as their three leading choices Truman, Wallace and General Eisen-

(CONTINUED ON PAGE 162)

Industrial Briefs . . .

• MOVES PLANT—Transomatic Corp. of America has announced the removal of their entire plant to new and larger quarters in a one-story modern equipped building at Route 12, Flemington, N. J.

• APPOINTED MEMBERS — Dr. Frederick Seitz and Dr. Roman Smoluchowski of the Carnegie Institute of Technology have been appointed members of the newly organized Committee on Solid State in the Division of Physical Sciences of the National Research Council. Dr. Seitz is the head of the Physics Dept. at Carnegie, While Dr. Smoluchowski is an associate professor of metallurgical engineering.

• WEAN EXPANDS—The Wean Engineering Co. has announced that it has placed a contract with the Campbell Construction Co., Warren, Ohio, for a fabricating and assembly plant to be constructed on property in Warren on Ratliff Road adjoining the main line of the Erie R. R. The plant is to be used for the fabrication of materials which cannot be obtained from the company's normal suppliers, and for the assembly of export shipments of the sheet, tin and strip mill machinery manufactured by the company.

• NEW WISCONSIN FIRM—The Fairchild Mfg. Co., farm implements, has begun operations at Fairchild, Wis. J. W. Jeffries is president.

• CHANGE OF ADDRESS — The Chicago Nipple Mfg. Co. has announced the removal of their nipple manufacturing plant and general offices to 1616 S. Laramie St., Cicero, Ill. The coil and pipe fabricating plant will remain at the former Clybourn Ave. location. The company also announced that the address of their Baltimore plant at 4109 Boston St., will remain unchanged.

• BEGINS CONSTRUCTION — Socony Vacuum Oil Co. will soon begin construction of a blending plant and distributing facility on a 36-acre site in Chicago. The property was purchased in 1944 and lies in Cicero immediately north of the Chicago Sanitary Canal, east of Cicero Ave. and along the rail line of the Belt Railway Co. of Chicago.

• FORMS COMPANY—B & M Mfg. Co. with general offices at 19 N. Harrison St., East Orange, N. J., has recently been formed by Wiley W. McMinn, and Olof Brant, formerly vice-president and chief development Engineer respectively of Agaloy Tubing Co. The company's factory at 1825 Monroe Ave., Grand Rapids, will manufacture spirally formed tubular products under the trade name of Spiralock. One product of special interest is a new tube with an improved interlocked spiral joint.

• TRANSFERS OFFICES — The Alco Products Div. of the American Locomotive Co. has transferred its head offices from New York City to Dunkirk, N. Y. Division director Hugh M. Corrough said all sales, engineering and manufacturing operations will be handled through his offices in Dunkirk.

• EXTENDS LINE—Hanson & Co., manufacturers of precision gages of Detroit, is extending its activities to include the marketing of standard precision fixtures in addition to gages. B. A. Johnston is sales engineer for the company.

• NEW COMPANY—The Taylor-Woodward Foundry, manufacturer of automotive castings, is scheduled to begin operation the latter part of this month at Bessemer, Ala. Frank M. Taylor is president of the new company and A. H. Woodward, Jr., is secretary-treasurer.

Detroit Lowers Sights To 4.5 Million Units For Whole Year 1947

Detroit

• • • **The rosiest estimate** of passenger car and truck production being heard around Detroit these days is 4,500,000 units for 1947.

Earlier in the year, the automobile industry had hopes of turning out 5 million vehicles in 1947. Recent supply difficulties, the threatened coal strike and the continued demand for steel by all other industries has reduced the original 5 million vehicle estimate to wishful thinking.

Despite signed contracts, the Detroit labor situation is none too promising. Walkouts by workers during the recent heat spell proved this. In addition to their labor worries, car manufacturers have to think about the tight sheet steel problem and pig iron. Foundries also report that coke is exceedingly difficult to obtain in satisfactory quantities. August was a poor month for steel deliveries to the automobile industry and September is not expected to be much better.

To turn out 4½ million cars this year the automobile industry will have to average more than 85,000 cars and trucks during the remainder of the year. Several plants are expected to close down for model changes later this year. In addition, other producers will shut down to check their inventories. While not impossible, an average production of 85,000 vehicles each week for the remainder of 1947 appears to be optimistic in the light of present conditions.

Car manufacturers appear to have few worries about the market for their new cars. No car manufacturer reports less than a year's orders on the books. As long as new cars continue to sell on used lots at higher than list prices auto dealers expect few cancellations. Many automobile executives are of the opinion that it will be at least two years before present demand for automobiles eases noticeably.

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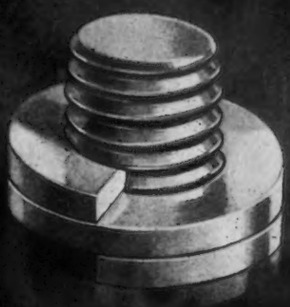

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TWO TYPES of this new Diamond G Product, manufactured by the Garrett Company, are available. One replaces the conventional nut and is called the Diamond G Spring Nut. The other is made with spring action tension in it in such a way that it supplies action similar to that of a lock nut —the threads inside of the Diamond G Spring Lock Nut maintain a strong grip on the bolt, or screw, and the tighter it is drawn up the greater the locking action.

AVAILABLE IN TWO AND THREE TURNS—depending on the requirements. The two turn type is for use on light assemblies and the three turn type is recommended when it is necessary to use heavy tightening torques on assembly.

FOR DRIVING OR SETTING—adaptable socket wrenches are now standard items as manufactured by Apex Machine and Tool Company. These new Diamond G Products —Spring Nut and Spring Lock Nut—have all of the advantages of regular nuts and are adaptable for use in hopper feeders. Both types are priced to offer a considerable saving over the conventional type of nut, or fastening device. These products are available in rust-resisting metal as well as high carbon steel.

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House Banking Group May Launch Probe Of The Housing Situation

Washington

• • • **Unless the joint** Senate-House committee appointed to investigate the housing situation is able to come up with most of the answers and specific recommendations by next January, when Congress convenes, it is believed here that the House Banking Committee may launch an independent probe on the subject.

That many Congressmen are convinced that all is not going to be well was seen in a statement last week by chairman Jesse Wolcott of the House Banking Committee. He predicted that further extension of rent control is likely unless the housing shortage has measurably improved by Mar. 31, expiration date of control.

Meantime, the opening of public hearings by the joint committee to investigate housing is scheduled for the middle of September.

High cost and shortages of building materials, as well as productivity and cost of labor, will receive top billing when the hearings open, it is learned. Also, an attempt will be made by the group to determine whether removal of new housing from rent control and the lifting of controls over construction activity has increased home building as had been predicted by builders.

Regardless of what the committee may find and despite the August seasonal gain of 5 pct over July—and a 15 pct increase over activity in August 1946—it is now certain that new construction for 1947 will not go above the revised estimate of $12.5 billion, scaled downward earlier this year from the optimistic $15 billion or better as predicted last December.

Total new construction put in place during the first 8 months of 1947 is estimated by the Commerce Dept. at about $7.7 billion. This figure, however, does represent a 32 pct gain over the $5.8 billion figure for the comparable period in 1946 when construction control was rigidly exercised by housing expediter Wilson Wyatt.

On the surface, it would seem that any investigations will have to dig deeper than elimination of

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rent ceilings on new housing and lifting of building controls.

While government housing experts openly predicted that lifting construction controls would send nonresidential building sky-rocketing, the government's own figures reveal that nonresidential construction for 1947 to date actually has decreased slightly over 1946 while residential construction has increased by a third.

Private industrial construction to date has increased by only 1½ pct over the first 8 months of 1946.

On the other hand, public construction has mounted steadily upward from a total of $1.1 billion for the first 8 months of 1946 to well over $1.8 billion for the same period this year despite reduced government activity in the housing field.

Meanwhile, total new construction put in place during August had an estimated value of $1.2 billion, according to the monthly report issued by the Construction Div., Dept. of Commerce.

Private construction amounted to $909 million, which includes $443 million for residential (exclusive of farm) building and $139 million spent for erection of industrial facilities.

Some $303 million was spent during the month on public construction including $135 million for highway projects, $31 million for educational, medical and other institutional facilities, and $2 million for industrial building. The armed forces spent $19 million for building purposes.

Lists Minerals and Uses

Washington

• • • **With a view** toward aiding industry in locating plants near areas of appropriate minerals, the Commerce Dept. publishes a new report, "Industrial Uses of Selected Minerals."

The new publication lists some of 200 commercially significant minerals and their principal industrial uses. It is not represented as a mineralogical study and states that further information concerning characteristics and value of mineral listed should be obtained in cooperation with professional geologists.

Robb Heads Committee For AFA Convention In Philadelphia, May 3

Chicago

• • • **The general arrangements** committee for the 1948 convention and exhibit of American Foundrymen's Assn. in Philadelphia May 3-7 will be headed by John M. Robb, Jr., Philadelphia resident manager of Hickman, Williams & Co., Chicago headquarters of the International Technical Society has announced.

A director of the AFA and member of its executive committee, Mr. Robb is a charter member and past chairman of the Philadelphia chapter, the "host" group to the 52nd annual meeting of the 9700-member society.

William Morley, foundry manager of the Olney Foundry Div. of Link-Belt Co., Philadelphia, a director of the chapter, serves as vice-chairman of the general committee. Also serving on the committee is B. A. Miller, chief metallurgist of the Cramp Brass & Iron Foundries Div. of The Baldwin Locomotive Works, a director and the immediate past chairman of the chapter.

Other members of the group include W. B. Wilkins, president-general manager, American Manganese Bronze Co.; Stanley Kirn, president, M. L. Kirn & Bros.; Thomas J. Gerwig, sales representative of Republic Steel Corp.; H. L. McClees, president, Crucible Steel Casting Co., Lansdowne, Pa., and George F. Pettinos, Jr., vice-president and general manager of George F. Pettinos, Inc.

Ford Buys Forging Plant

Washington

• • • **Additional facilities** for supplying its own forgings for cars, trucks and tractors will be placed into operation by the Ford Motor Co. as soon as it can refit the former Republic-operated wartime gun forging plant at Canton, Ohio. Purchase of the plant, consisting of 17 acres, a forge shop, boiler house and numerous other buildings and equipment, for $950,000 cash has been announced by WAA. About 1000 workers will be employed, the company said.

Lake Ore Shipments Are Nearing Wartime Record

Cleveland

• • • **Lake Superior iron** ore shipments are nearing wartime record proportions when August shipments of 12,122,244 gross tons are added to previous shipments this year, to total 51,014,783 gross tons. August shipments this year are 24.02 pct higher than a year ago. The year's total of over 51 million tons to date is 51.72 pct higher than 1946 shipments to Sept. 1. August shipments may be compared with the wartime peak in August 1943, of 13,976,770 tons. These statistics are compiled by the Lake Superior Iron Ore Assn.

Cumulative shipments to Sept. 1 for 1946 and 1947 by port are as follows:

Port	To Sept. 1 1947	To Sept. 1, 1946
Escanaba	2,719,391	1,638,361
Marquette	289,134	200,948
Marquette	2,641,821	1,150,303
Ashland	2,358,684	1,518,560
Ashland	1,123,916	626,881
Superior	15,932,806	9,627,108
Superior	875,354	433,654
Superior	989,636	440,823
Duluth	12,138,288	9,160,511
Two Harbors	10,908,582	8,111,389
U. S. Ports	49,977,612	32,908,538
Michipicoten	269,941	285,702
Port Arthur	767,230	429,041
Canadian	1,037,171	714,743
Grand Total	51,014,783	33,623,281

Mine Loans Still Possible

Washington

• • • **Contrary to impression** in some areas, repeal of Sec. 14 of the RFC Act by the 80th Congress has not affected negotiation of mining loans. RFC will continue to receive and consider applications for such loans under its powers to lend money for business purposes.

The lending agency points out, however, that applicants for mining loans must provide sufficient security to reasonably assure retirement or repayment; also required is certification that such credit is not otherwise available on reasonable terms. These conditions, however, are common to all RFC loans.

Applications may be filed with the Washington headquarters or with any of the RFC's field offices.

Dr. Mathewson of Yale To Get ASM Gold Medal

Cleveland

• • • **Dr. C. H. Mathewson,** Professor of Metallurgy at Yale University, will receive the Gold Medal of the American Society for Metals for 1947, according to an announcement by W. H. Eisenman, national secretary of the society. The ASM Gold Medal is awarded "for outstanding metallurgical knowledge and great versatility in the application of science to the metal industry as well as exceptional ability in the diagnosis and solution of diversified metallurgical problems."

Award of the medal will be made in Chicago in October at the annual banquet of the ASM, held as an important event of the National Metal Congress & Exposition.

Dr. Mathewson, third metallurgical scientist to receive the Gold Medal since its inception in 1943, is widely known for his specialization in studies on constitution of alloys, crystallography and recrystallization of metals. Previous winners of awards are Dr. Zay Jeffries, vice-president, General Electric Co., and Dr. Earle C. Smith, chief metallurgist, Republic Steel Corp.

The ASM Gold Medal Winner was born in Essex, Connecticut, and was graduated from Yale in 1902 with the degree of Ph.B. Four years later he received the degree of Ph.D. from the University of Gottingen. Following one year as an instructor of metallurgy at the Massachusetts Institute of Technology, Dr. Mathewson returned to Yale in 1907.

Report Out on Free Pistons

Washington

• • • **Recent technical** articles on free piston engines are summed up in a Commerce Dept. publication, "Literature and Patents on Free Piston Machinery," the department's Office of Technical Services announced recently.

All of the articles appeared in U. S., British, French and German technical periodicals between 1935 and 1944. Important developments brought out by Junkers of Germany, Pescara of Argentina and Sulzer Bros. of Switzerland are included in the compilation.

Increases Allocation Of Steel for French Cars

Paris

• • • **Allocations of steel** to French automobile producers amounted to 80,240 metric tons for the second quarter of 1947 against 73,199 tons during the first quarter. The schedule of production of the fourth quarter on the basis of the allocations of steel received during the second quarter will include 38,473 vehicles of which 24,442 will be private cars and 13,000 will be trucks and buses. On the total of 24,442 cars, 19,839 will be exported, that is 81 pct of the production, against 75 pct for the third quarter.

Despite production increase, the French market will not receive more cars. As far as trucks and buses are concerned of the total of 13,000 to be built, 5400 will be for export or 42 pct of the production.

Total steel allocations to automobile and bicycle industry amounted (including repair parts, auto bodies and bicycles) for the second quarter to 125,000 metric tons, but this tonnage includes for repair parts, 8900 tons, for bodies 23,655 tons, and 9700 tons for the manufacture of bicycles which are classified in the automobile industry in France. In all, only 64 pct of the steel allocated to the industry is actually for the production of automobiles.

To Hold Spectroscopy Meet

Pittsburgh

• • • **The Eighth Pittsburgh** Conference on Applied Spectroscopy sponsored by the Spectroscopy Society and the University of Pittsburgh will be held Thursday to Saturday, Nov. 13 to 15, 1947, inclusive at the Mellon Institute Auditorium. As in the past, sessions on both emission and absorption spectroscopy are planned.

Suggestions and offers of papers for the program are very welcome. If possible, titles of papers should be sent in by Sept. 8 but definitely all titles together with a brief abstract of the contents of the paper should be in by Oct. 4, 1947 so that a balanced program might be arranged. Address inquiries or offers of papers to Mary E. Warga, University of Pittsburgh, Pittsburgh 13.

Exports $82 Million In First Half of '47

Washington

• • • **Exports by the** aircraft industry for the first half of 1947 amounted to approximately $82 million, according to the Aircraft Industries Assn. Making up the total were 1841 aircraft units valued at $33 million; 2374 engines, valued at $8.3 million; and, $40 million worth of parts and components.

June shipments amounted to 272 aircraft, including 44 military type planes, totaling $4.7 million in value; 300 engines, worth $1.3 million; and, $6.7 million worth of parts and components, the association said.

Of the 6-month total, 201 were military type planes. These went largely to Central and South America. Of the 44 craft shipped in June, for instance, six bombers were tagged for Peru, 11 fighters for Ecuador, seven military trainers for Brazil, two for Mexico and one each for Brazil and Venezuela. China was shipped 16 trainers.

Civilian-type planes shipped during the first half amounted to 1143 aircraft valued at more than $16.3 million; 414 of the total were used planes having a value of $13 million.

Bath Iron Reports Loss

Boston

• • • **Bath Iron Works Corp.** for the first half of this year reports a net loss of $1,090,132, whereas for the like 1946 period it had a net profit of $1,784,845, equal to $4.26 a share.

The net loss this year includes $583,000 loss on future ship construction under seven existing contracts in excess of net reserve of $400,000 provided in 1946 for such losses. The net loss is after giving effect to $2,200,000 tax carryback credit.

The company has cancelled a contract for production of merchandising vending machines. It has a contract from Spacard, Inc., New York, for soft drink cup vending machines. Its crushing machinery business, though not large, was profitable during the first five months of this year, and management is negotiating for additional vending machine business.

New Group Buys Out Pump Manufacturer

New York

• • • **All American Industries,** Inc., who recently bought out the Fitzsimons Co., Youngstown, and the Oklahoma Steel Castings Co., Tulsa, Okla., has announced the acquisition of the outstanding capital stock of A. D. Cook, Inc., Lawrenceburg, Ind.

This company is the manufacturer of a line of deep well steam driven pumps, plunger pumps, and turbine motor driven pumps, shallow well pumps, well supplies, and compression type fire hydrants. It also has a gray iron foundry for its own use, in addition to a completely equipped plant for the manufacture of pumps.

Robert C. Hardy, president of All American Industries, Inc., said that Cornelius O'Brien, who has been president of A. D. Cook, Inc., for a number of years, will continue with that company as key personnel will be retained. chairman of the board, and other

Has $17 Million Backlog

Youngstown

• • • **The Aetna-Standard** Engineering Co. reports a mill equipment order backlog of $17 million which it is shipping at a rate slightly better than $1 million per month.

Its domestic backlog represents 75 pct of the total, according to H. Gere Coffey, vice-president of sales. Steel mill equipment orders represent about 75 pct of the domestic backlog, half of which is for tube mill equipment and half for flat-rolled and coating equipment. Of the domestic backlog, 25 pct is for brass and aluminum mill equipment.

Foreign business represents 25 pct of Aetna-Standard's total backlog, with orders from Russia, France, Australia, Chile, Brazil and Argentina. Its foreign order book is made up of 90 pct mill equipment for steel pipe and tubing production, including seamless tubing and continuous buttweld tubing. Copper tubing machinery makes up the 10 pct balance of foreign orders. It includes billet piercing mills and cold drawing equipment.

"Under-Depreciation" Of Assets Causes Serious Concern to Industry

New York

• • • **Industry's depreciation** policy is being subject to increased review and analysis as a result of the sharp disparity between current amounts charged for depreciation and the cost of replacements, according to the National Industrial Conference Board's monthly survey of current business practices.

The majority of the executives cooperating in the survey regard this "under-depreciation" of fixed assets as a serious problem at this time. Some also contend that production costs are understated and that profits are partly fictitious unless adjustment is made for higher replacement costs. A few companies have altered their depreciation policies for managerial purposes and others are considering such action.

Some executives, however, indicate a reluctance to establish two sets of accounts, one meeting the requirements of the Internal Revenue Bureau and the other reflecting management's view of proper depreciation charges. The real solution to the problem, it is stated, lies in "a change in tax laws."

Most of the companies represented employ the straight-line method of allocating depreciation. A few concerns are considering the adoption of the "declining-balance" method. Infrequent mention was made of the unit-of-production method. A number of concerns noted that they advanced their depreciation rates during the war when they switched from one shift to two-shift or three-shift operations. However, some indicated that the Treasury allowed much less of this accelerated depreciation than they believed conditions warranted.

Approximately 15 pct of the companies have established special reserves for capital replacements. Most of these have allowed for the increase in costs. Some, however, provide for the higher costs by a general contingency reserve. Other executives indicate that they are not impressed with the idea of setting up special reserves, but that the replacement problem is considered in determining general finan-

cial and dividend policies.

As one steel producer notes: "Whether you set such earnings up in a reserve account or allow them to flow into surplus makes very little difference. The main fact is that the percentage of earnings, either on sales or invested capital, should be at a much higher rate than existed 8 or 9 years ago. The important part of all this, of course, is to have the public understand that to create jobs, sufficient earnings must be made beyond reasonable and fair dividends."

Because the majority of corporations look to surplus accumulation to meet the increased cost of capital replacements, the possible impact and restrictions of Section 102 of the tax law are being carefully analyzed. It is contended that if a business is unduly restricted in the amount of profits it can retain, the future of the enterprise is seriously threatened. One general complaint made against Section 102 is the "uncertainty it creates." Approximately one third of the executives state that they have felt hampered by the provisions of Section 102. The remainder felt that this section has no bearing on their situation and are confident that they can justify the amounts retained in surplus.

Liberalization of the tax provisions with respect to depreciation, it is believed, would greatly accelerate modernization and plant expansion. Frequently regulations and individual rulings are "narrow and inequitable and in the end work to limit or reduce large potential expenditures for new plants, new construction and new facilities. For the past twelve years the income tax law has provided very little incentive for achievement, or increase in production or earnings." Some executives also contend that depreciation schedules are arbitrary and unjust, and that insufficient recognition is given to the element of obsolescence.

$3 Million Reconstruction

Paris

• • • **The French company,** Mathis Automobile Works, has been authorized to use $3 million of equipment in the United States for reconstruction of the Strasbourg works, which were damaged during the war and which will manufacture American-type farm tractors under license from Minneapolis Moline.

New Willys Body Shop Is Now Partially Open

Toledo

• • • **Willys-Overland's new** body shop is now producing cabs and pick-up boxes for two and four-wheel drive trucks. It is expected that stampings as well as the assembly of bodies will be transferred to the Toledo plant in the near future from the plants of present suppliers.

According to Willys' officials, this move will make Willys a more nearly self contained manufacturing plant and will increase employment by at least 700 workers.

Heretofore, stampings for the Willys' trucks and bodies for Willys' station wagons and sedan delivery have been made by the Hayes Mfg. Co., Grand Rapids. Hayes will continue to stamp out and assemble Willys' station wagons, and Jeep bodies will continue to be made by the American-Central Co., Connersville, Ind.

The present plant assembly capacity is 167 units per day, but this is expected to be increased in the near future to 360 bodies. Stamping equipment will then be moved from Hayes to Willys-Overland for parts common to the stamping and assembly of the Willys' sedan delivery.

According to William E. Paris, vice-president in charge of operations, Willys' $5 million body stamping shop is now nearing completion. Eventually, he said, this department will be capable of making all stampings for the Willys' commercial line of vehicles.

A total of 53 presses have been installed in the large stamping shop which consists of 5 main lines. The largest press is 1400 ton capacity, triple action and is 37 ft high. Presses range in size from the 1400 ton unit to a 160 ton single action press. Presses will be used to stamp out fenders, side, floor, roof, door and cowl panels.

Major dies for Willys' operations will be supplied by vendors, but a die maintenance shop will make smaller dies for new Willys' models and maintain present dies.

Willys is installing hydromatic and ultra speed and multiple welding machines in its new body shop, some of which are capable of welding 320 door assemblies per hr.

French See No Chance of Improving Steel Output in Near Future

Paris

• • • **The French Interministerial** Committee has fixed the steel allocations for the third quarter of 1947 at 1,477,000 against 1,450,000 metric tons for the second quarter. But taking into account difficulties of supply—namely the import of coal and steel from the United States—it has been decided to reserve 10 pct of these allocations, which will be released if and when the situation improves.

In the course of a debate in the French Assembly on the present system of allocation, M. Bergeret, deputy, asked if it would not be easier to fix allocations for a period of 6 months instead of 3 months, which he thought was too short. The Minister of National Economy replied that it was not possible at present to make provision for a period longer than 3 months owing to the uncertain conditions prevailing in the supply of raw materials. At the present time allocations are

Third Quarter Allocations Are Little Better Than Those In Previous Period

• • •

fixed after receiving the proposals of the various ministries and after discussions in the Interministerial Committee the allocations are attributed between the main industrial branches. Inside each industrial branch, allocations are made by the Ministry of Production.

For the third quarter allocations of steel have increased from 60,000 to 65,000 metric tons for farm equipment, from 61,000 to 66,000 metric tons for North Africa, from 45,000 to 47,000 metric tons for French overseas territories, from 33,000 to 38,000 metric tons for craftsmen and from 125,000 to 145,000 metric tons for the automobile industry. But the shipment of these allocations depends upon an improvement in supply—otherwise they will be cut by 10 pct.

As at the end of last year and the beginning of this year, officials expected that the production of iron and steel would increase more rapidly than it did. Allocations were fixed at a level somewhat higher than the resources which came available, and a backlog built up, estimated at the present time to be 400,000 metric tons. Efforts are being made to adjust the allocations to the real resources available without being guided by too much optimism for the next few months.

In fact, the Interministerial Committee came to the conclusion that there is no prospect of an improvement in production for the next months to come, as prospects of coal imports and production do not permit the allocation to the iron and steel industry of more than the quota of 700,000 metric tons a month it received during recent months. In consequence steel production for the third quarter will not exceed 1,300,000 metric tons and 1,350,000 tons for the fourth quarter.

To these tonnages imports from the United States must be added, which were of the order of 100,000 tons during the second quarter and which are expected to increase to 125,000 during the next two quarters. The imports of steel from the United States are expected to increase to a rate of 500,000 tons a year. A smaller tonnage is also expected from other sources of supply, principally from Belgium, whose deliveries have been at the rate of 110,000 tons a year.

The new trade agreement signed between France and Belgium for one year on July 8 showed some Belgian reluctance to increase its exports of iron and steel products to France, owing to more advantageous conditions in other markets. Though export quotas included in the new agreement are still not known, it is said that the question has been settled and that exchange of goods between the two countries will be substantially increased.

Whereas last year the credit provided for buying steel abroad by the government was fixed at $34

million and was not entirely used because the rate of imports was low, this year an import of 490,000 metric tons was provided for and, according to figures released during the discussion of the budget of the Ministry of Industrial Production, these imports are expected to jump to 850,000 metric tons.

The committee of economic experts, which has been judging the necessity of maintaining the subsidies to the iron and steel industry, has filed its reports. The conclusion is that costs are much higher than the official prices granted when the prices were increased in March to $4.89 a metric ton for basic Bessemer rerolling semis ($5.24 for openhearth quality); $5.34 for basic bessemer ingots and forging blooms ($5.75 openhearth quality); $6.42 for basic bessemer merchant bars ($6.84 for openhearth quality).

The total amount of subsidies for the second half of 1946 will be fixed at about 3,250 million francs and for the year 1947 the subsidy would be about 8 billion francs. It is possible that the last increase of wages and the present increase asked by workers' unions will lead to an increase of the subsidies necessary to cover the loss of the iron and steel works. During the debate at the French Assembly on the budget of the Ministry of Industrial production a credit of 7,554 millions of francs was provided for this purpose and it seems that this amount will be insufficient owing to the present trend of prices in France, and the prospect of an increase of wages of about 11 pct.

American Foundry Busy

Cincinnati

• • • **Active operations of** the American Foundry Machinery Co., including a recent order for more than three million dollars' worth of equipment for the Veterans' Administration, has been a boon for other metal working industries.

Because of the full-scale production of the Norwood plant, the company has been subcontracting work to American Tool Works Co. and the Cincinnati Milling Machine Co.

Canadian Steel Production and Shipments

Toronto

• • • Canadian production of primary iron and steel shapes for the month of June totalled 253,869 net tons as compared with 282,543 tons in May and 226,383 tons in June 1946. Output for June included 244,117 tons of carbon steel shapes and 9752 tons of alloy steel shapes. In the production figures for the month are included 70,478 tons shipped to producers' own plants or to other plants within the primary industry for further processing.

Shipments of primary iron and steel shapes in June amounted to 188,655 net tons of which 179,709 tons were carbon steel shapes and 8946 tons alloy steel shapes; in May shipments included 191,562 tons of carbon steel shapes and 11,119 tons of alloy steel shapes and for June 1946, shipments included 215,316 tons of carbon steel shapes and 5399 tons of alloy steel shapes. The above figures for June which show iron and steel shapes made for sale do not include deliveries for further processing.

For the 6 months ended June 30 production of primary iron and steel shapes totalled 1,621,207 net tons while shipments for sale amounted to 1,230,781 tons and deliveries for producers' interchange amounted to 406,996 tons. For the corresponding period of last year production of primary iron and steel shapes amounted to 1,451,707 net tons and shipments for sale, 1,186,742 tons, and producers' interchange, 274,530 tons.

The following table shows production and shipments for sale of primary iron and steel shapes for the month of June in net tons:

June 1947	Carbon Steel		Alloy Steel	
	Made	Shipped	Made	Shipped
Billets, etc. for forging	7,043	4,400	682	569
Other semi-finished shapes not for rerolling by makers	31,548	526	583	.....
Structural shapes and piling	13,255	15,533	.....	.....
Plates	15,539	14,797	.....	.....
Rails	17,341	16,004	.....	.....
Tie plates and track material:				
Splice bars	1,200	1,050	.....	.....
Tie Plates	2,603	2,966	.....	.....
Spikes	1,027	1,064	.....	.....
Tool steel	398	274	388	239
Concrete reinforcing bars	6,179	6,411	.....	.....
Hot-rolled bars for cold finishing	178	.....	.....	.....
Other hot-rolled bars	36,622	32,433	6,465	6,580
Pipes and tubes	9,719	10,876	.....	.....
Wire rods	22,275	17,514	25	21
Hot-rolled black sheets	22,664	16,861	.....	.....
Cold-reduced black sheets	3,081	3,081	.....	.....
Galvanized sheets	7,644	7,481	.....	.....
Steel castings—by ingot makers	2,127	2,168	38	76
—by other foundries	4,014	3,924	1,422	1,323
All other shapes including tinplate, tinmill blackplate, cold-finished bars and strip, etc.	39,660	22,346	149	138
TOTAL	244,117	179,709	9,752	8,946

Producers' shipments of primary iron and steel shapes sub-divided according to principal consuming industries for the month of June, in net tons, follow:

Industry	Carbon Steel	Alloy Steel
Automotive industries	6,557	3,698
Agricultural, including farm machinery	7,988	61
Building construction	24,162	39
Containers industry	17,977	3
Machinery and tools	12,254	610
Merchant trade products	18,408	74
Mining, lumbering, etc.	6,113	503
National defense	94	.....
Pressing, forming and stamping	10,818	67
Public works and utilities	975	48
Railway operating	26,305	230
Railway cars and locomotives	15,245	270
Shipbuilding	3,536	18
Miscellaneous and unclassified	828	113
Wholesalers and warehouses	27,003	126
Direct export—to British Empire	706	121
—to other countries	740	2,875
TOTAL SHIPPED FOR SALE	179,709	8,946
Producers' interchange	69,895	583

Electricity Demand Now At New Peak; Utilities Not Yet Able to Fill It

Chicago

• • • **Demands for electric** service and power have reached an all-time high, both in industry and for household use, according to a survey recently completed by the Northern Trust Co., Chicago. Although electric power output now exceeds the war peak, the electric utility companies have not yet been able to meet demand, the report states. During 1946, the industry added 2.1 million customers to its lines and of this total 1.8 million represented residential and rural customers.

Electric power production in 1946 totaled 223 billion kw-hr or about 2 pct less than in 1944, the peak war year. In 1939 the industry produced 128 billion kw-hr. In the 4 weeks ended Aug. 16, 1947, the rate of gain in output over a year ago was 10 pct. In recent months the residential requirements have been running 112 pct above the 1939 level, commercial business is up 85 pct and the industrial load has increased by 132 pct. While the industrial load is still slightly less than the war time peak, the residential and commercial loads have expanded sharply.

The new industrial uses for electrical power caused by the war are being permanently adopted on an increasingly wider scale. Resistance welding, electroplating, induction heating and x-ray inspection of products are but a few examples which have caused higher demand by industry. Refining of aluminum, copper and other metals are requiring larger amounts of power and the production of these metals is far above prewar. The industrial growth in the South and the far West during the war has been retained and is likely to expand further. The average American home now uses 50 pct more electricity than in 1939.

Many new uses for electricity indicate that the residential loads will continue to rise. Home freezers, electric water heaters, dishwashers and automatic laundry units are expected to continue their strong growth trend. An-

MACHINE TOOLS

. . . News and Market Activities

Industry Moves to Chicago As 1947 Machine Tool Show Opens

• • • **Advance echelons** of the visiting horde began flocking into Chicago early this week for the 1947 Machine Tool Show, which has temporarily turned Chicago into the industrial capital of the world.

Preview pasteboard holders, guests of the National Machine Tool Builders' Association, show sponsors, comprised a substantial segment of "Who's Who" in American industry, and in fact, attendance at this show by the chief executives of companies in the metalworking industry is expected to hit an all-time high.

In addition to domestic big-wigs, top metalworking talent from 32 foreign countries is expected to be present and accounted for by the time the Overseas Dinner rolls round.

With 2021 examples of the newest and finest machine tools the industry can produce in operation in a 13-acre segment of the Dodge-Chicago plant, the metalworking industry for the first time since 1935 has the opportunity to inspect all the new machines together at one time.

According to reports, it cost $1,000,000 to bring the exhibits from the freight car siding at the plant, erect them on the floor and then return them to the freight cars when the show is over. The packing boxes, ready for their return to all parts of the country, cover more than 13 acres outside the plant.

Most executives in the machine tool industry started the exodus to Chicago last week-end, and many arrived on Sunday for staff meetings and final check-ups on the exhibits Monday. Every available hotel room, not only in Chicago, but in nearly all nearby cities and towns, is to be occupied by visitors to the show. Two lake steamers have been chartered to serve as additional housing for the visitors, and special plane service will be maintained to many cities expressly for the show.

In major selling sectors, there has been some change in the machine tool market pattern, and

August Orders Drop Under July but Some Sources Blame the Show

° ° °

August sales, according to reliable sources in the trade, were about 25 pct under July. To some observers, this drop can be explained by the show, which certainly has caused some buyers to hold off until Sept. 17 at least.

In Cincinnati, representatives of the machine tool companies left for Chicago early for pre-view conferences and briefing on Sunday and Monday, and foreign visitors were very much in evidence inspecting the plants before leaving for Chicago. Interest is high but opinions vary as to the effect of the show. Some producers feel that the show will promote and increase ordering, while others take the position that unless there is a tremendous pick-up in ordering, a drastic slow-down is in order for the industry within the next six months.

In the East dealers report there is little activity and place their reliance for future business on the aftermath of the show. One builder here reports that the watch industry is apparently going ahead with a tooling program and there has been a slight improvement in sales to watch manufacturers in recent weeks.

Exporters of machine tools find that the Latin American market has suffered considerably from the exchange restrictions now in effect in Argentina, Brazil, and Colombia. It is understood that Mexico will institute new restrictions within the next month. The machine tool trade has received semi-official information that the situation in Latin American nations may be relieved within the next few months by the release of U. S. funds to Latin America.

Much interest, users' and producers', centers in the Chicago show and indications are that many new Englanders are attending. Most everybody connected with the trade is optimistic regarding the future. Hardly anyone will go so far as to predict business will be brisk, but many are confident that for the long pull it will run ahead of pre-war days.

In Detroit, activity in the machine tool field was reported to be very quiet on the eve of the Machine Tool show. Most talked about development here was the hold-up (some believe it is a cancellation) of the substantial tooling program for Detroit transmission division of General Motors. Work on standard machine had been held up (IRON AGE, Sept. 11, p. 290). This week several prominent suppliers in this area reported notification that the program has been canceled. However, some suppliers still cling to the hope that the program will be revived at a later date.

Much of the uncertainty around the new GM transmission program seems to revolve around Pontiac's plans for an automatic transmission. Unconfirmed reports had indicated earlier that this important GM division would use a hydramatic transmission, possibly produced by the Detroit transmission division. The reports of recent cancellations would indicate that important changes in the Pontiac transmission program may have been made.

Except for Hudson and Nash, none of the major auto producers are known to have completed their body die programs for 1948 models. However, some die shops have enough work on hand to indicate that a substantial amount of work has been placed. None of the major producers is expected, however, to introduce postwar models until 1948 and some like Ford may even delay until the new car can be called a 1949 model.

Generally speaking, however, the machine tool business in Detroit is very slow and executives here will be eagerly watching for indications that the Machine Tool show is going to give the industry a new lease on life.

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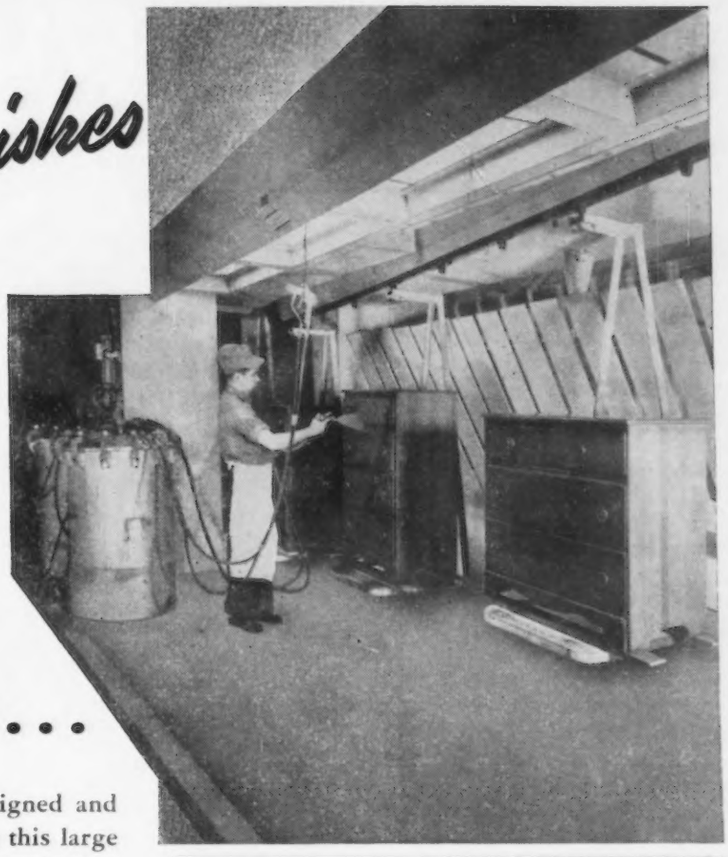

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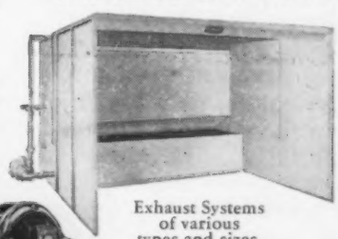

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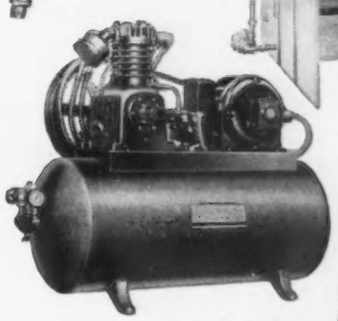

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NONFERROUS METALS

. . . News and Market Activities

Copper

• • • **Some producers have** sold out all their October copper and are receiving requests for additional tonnages. Demand from the wire mills continues very strong, and brass mill orders have improved since the summer when inventory reduction programs were in effect at plants of mills and consumers and when the realization came to copper consumers that it was no longer necessary to place their requirements well in advance. Copper tube and pipe demand are reported to be high, but brass pipe and rod have long been in excess supply. Export copper demand is very quiet and in the view of the industry will continue to remain so until U. S. currency is made available to foreign nations by means of the Marshall Plan, International Fund, World Bank or by increased domestic imports.

Trade reports indicate that the request for offerings of electrolytic copper for the permanent stockpile to be submitted this week to the Bureau of Federal Supply will bring forth no copper during the fourth quarter as the industry expects domestic requirements to take up all available supplies. Copper producers, like lead and zinc producers, are concerned over the clause affording the government protection in the event of a price decline but without corresponding protection to producers in the event of a rise in price. Some factors in the copper industry point out that when surplus copper is available for the stockpile, the government will be placed in the position of setting the market price of the metal based on its larger tonnage purchases.

Copper Institute figures for August show a 13,000 ton decline in shipments to 96,304 tons. The industry expects September figures to show considerable improvement. Refined production declined more than 6000 tons in August to 88,052 tons, due principally to the closing down of American Smelting & Refining Co.'s Perth Amboy furnaces under the threat of the strike. Primary production increased during the month by 3000 tons to 75,899 tons.

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Antimony

• • • **Approximately 1000** tons of antimony is being loaded this week in Shanghai for shipment to the United States. This shipment has had a serious depressing effect on an already weak antimony market. It is believed that the Chinese Government, which holds some 4000 to 5000 tons in warehouse in Shanghai would be willing to sell this metal as low as 25¢ per lb delivered New York, as compared with a domestic price quotation of 34.44¢ at New York. To date the metal remains without buyers here, for traders are fearful that in the present thin domestic market, domestic producers would react to its purchase by reducing their market price below the purchase price.

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Drop Bronze Ingot Prices

New York

• • • **With the announcement** of reductions in the prices of brass and bronze ingots last week by major producers, the industry met the lower price levels set by one producer the previous week. This price action reflects a low level of foundry buying and the relatively lower level of scrap prices prevailing.

Tin

• • • **Although Malayan** tin production is gradually improving in volume, it is still well below the expected production rates for this year and last which were set at 12,000 to 13,000 tons and 40,000 tons respectively. From a monthly production rate of little more than 600 tons in 1946, its production has been increased to some 3000 tons per month by year end. Total production in 1946 was reported at 7300 tons as compared with 8750 tons for the Netherlands East Indies, in normal times always a smaller producer. Malayan tin production has been very uncertain during the latter half of last year and the first half of 1947, varying erratically from a low of 369 tons in July to a high of 3587 tons in March. Shortages of coal, the difficulty in obtaining equipment repair parts and the unsettled condition of labor in the country all contributed to marked variations in monthly production rates. In the East Indies, meanwhile, the building and shipment of a total of eight dredges promises to permit larger production tonnages at an early date.

Shortages of Bolivian concentrates have drastically reduced the output of the government smelter in Texas City to an average monthly production during the first half of the year of less than 2900 tons. Operations for the last half are scheduled at 2500 tons a month.

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Firm Offers Lead Scrap

Washington

• • • **The U. S. Commercial** Co. is offering approximately 1140 short tons of lead scrap which it has received from Japan. The material will be sold in 24 lots on a sealed bid basis, for delivery f.o.b. cars at seller's warehouse, Staten Island, N. Y. Prospective bidders may inspect the material during customary business hours from Sept. 22 through Sept. 26 upon making request of U. S. Commercial Co. prior to Sept. 19.

Nonferrous Metals Prices

Cents per pound

	Sept. 10	Sept. 11	Sept. 12	Sept. 13	Sept. 15	Sept. 16
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	80.00	80.00	80.00	80.00	80.00	80.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$17.00
Beryllium aluminum 5% Be, dollars per lb contained Be	$35.50
Cadmium, del'd	$1.75
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$80 to $90
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$81 to $83
Nickel, electro, f.o.b. New York	37.67
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$64 to $67
Silver, New York, cents per oz.	70.50
Tin, Straits, New York	80.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Zirconium copper, 6 pct Zr. per lb contained Zr	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	18.00
No. 120	17.50
No. 123	17.00
80-10-10 ingot	
No. 305	22.00
No. 215	20.00
88-10-2 ingot	
No. 210	27.75
No. 215	26.25
No. 245	20.25
Yellow ingot	
No. 405	14.50
Manganese Bronze	
No. 421	16.50

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	15.75
0.60 copper, max.	15.50
Piston alloys (No. 122 type)	14.25
No. 12 alum. (No. 2 grade)	13.75
108 alloy	14.00
195 alloy	14.75
AXS-679	14.00
Steel deoxidizing aluminum, notch-bar, granulated or shot	
Grade 1—95 pct-97½ pct	14.50
Grade 2—92 pct-95 pct	12.75
Grade 3—90 pct-92 pct	12.00-12.25
Grade 4—85 pct-90 pct	11.50-11.75

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	37⅝
Electrodeposited	32.34
Rolled, oval, straight, delivered	32.59
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	33⅜
Zinc, Cast, 99.99	18¾
Nickel, 99 pct plus, frt allowed	
cast	51
Rolled, depolarized	52
Silver 999 fine	
Rolled, 1000 oz. lots, per troy oz.	67¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	43.00
Copper sulphate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz. lots, per oz.	54.00
Sodium cyanide, 96 pct, domestic, 200 lb drums	15.00
Zinc cyanide, 100 lb drums	34.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall; 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam. rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base. B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb f.o.b. mill. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75.

Round Rod: M, diam, in., ¼ to ⅜, 47¢; ½ to ¾, 45¢ 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M, size across flats, in., ¼ to ⅜, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 45¢; 3½ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M, form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢; 38 to 40, 75.5¢; 47 to 49, 98¢. Other alloys higher.

Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.21; 5/16 to ⅜, $1.12; ⅜ to 7/16, 97¢; 0.058 to 0.064, 7/16 to ½, 89¢; ½ to ⅝, 81¢; 0.065 to 0.082, ⅝ to ¾, 76¢; ¾ to 1, 72¢; 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.50
Large, over 12 in.	14.50

Copper, Brass, Bronze

(Cents per pound, f.o.b. mill effective June 11)

	Extruded Shapes	Rods	Sheets
Copper	33.53	....	33.68
Copper, hot-rolled	....	30.03	....
Copper, drawn	....	31.03	....
Low brass	34.04*	31.07	31.38
Yellow brass	32.39*	29.32	29.63
Red brass	34.65*	31.68	31.99
Naval brass	29.56	28.31	34.25
Leaded brass	27.98	24.39	30.13
Commercial bronze	35.52*	32.80	33.11
Manganese bronze	33.14	31.64	37.75
Phosphor bronze, 5 pct.	53.25*	52.25	52.00
Muntz metal	29.17	27.92	32.36
Everdur, Herculoy, Olympic, etc.	37.07	35.57	38.44
Nickel silver, 5 pct.	41.20	40.28	38.67
Architectural bronze	27.94	....	....

*Seamless tubing.

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Cartridge brass turnings	14½
Loose yellow brass trimmings	15½

Copper and Brass

No. 1 heavy copper and wire	15½—16
No. 2 heavy copper and wire	14½—16
Light copper	13½—14
Auto radiators (unsweated)	8½— 9
No. 1 composition	10½—11
No. 1 composition turnings	10 —10½
Clean red car boxes	9 — 9½
Cocks and faucets	8½— 9
Mixed heavy yellow brass	7 — 7¼
Old rolled brass	7 — 7¼
Brass pipe	8 — 8½
New soft brass clippings	11 —11½
Brass rod ends	9½—10
No. 1 brass rod turnings	8½— 9

Aluminum

Alum. pistons free of struts	3½— 4
Aluminum crankcases	5½— 6
2S aluminum clippings	8 — 8½
Old sheet & utensils	5½— 6
Mixed borings and turnings	— 2
Misc. cast aluminum	5 — 5½
Dural clips (24S)	5 — 5½

Zinc

New zinc clippings	6 — 6½
Old zinc	4¼— 4½
Zinc routings	2½— 3
Old die cast scrap	2½— 3

Nickel and Monel

Pure nickel clippings	15½—17½
Clean nickel turnings	14 —15
Nickel anodes	16 —17
Nickel rod ends	17 —18
New Monel clippings	10 —10½
Clean Monel turnings	7 — 8
Old sheet Monel	9½—10
Old Monel castings	7½— 8
Inconel clippings	8 — 8½
Nickel silver clippings, mixed	7½— 8
Nickel silver turnings, mixed	5½— 6

Lead

Soft scrap lead	10 —10½
Battery plates (dry)	5 — 5½

Magnesium Alloys

Segregated solids	6½— 7
Castings	4½— 5½

Miscellaneous

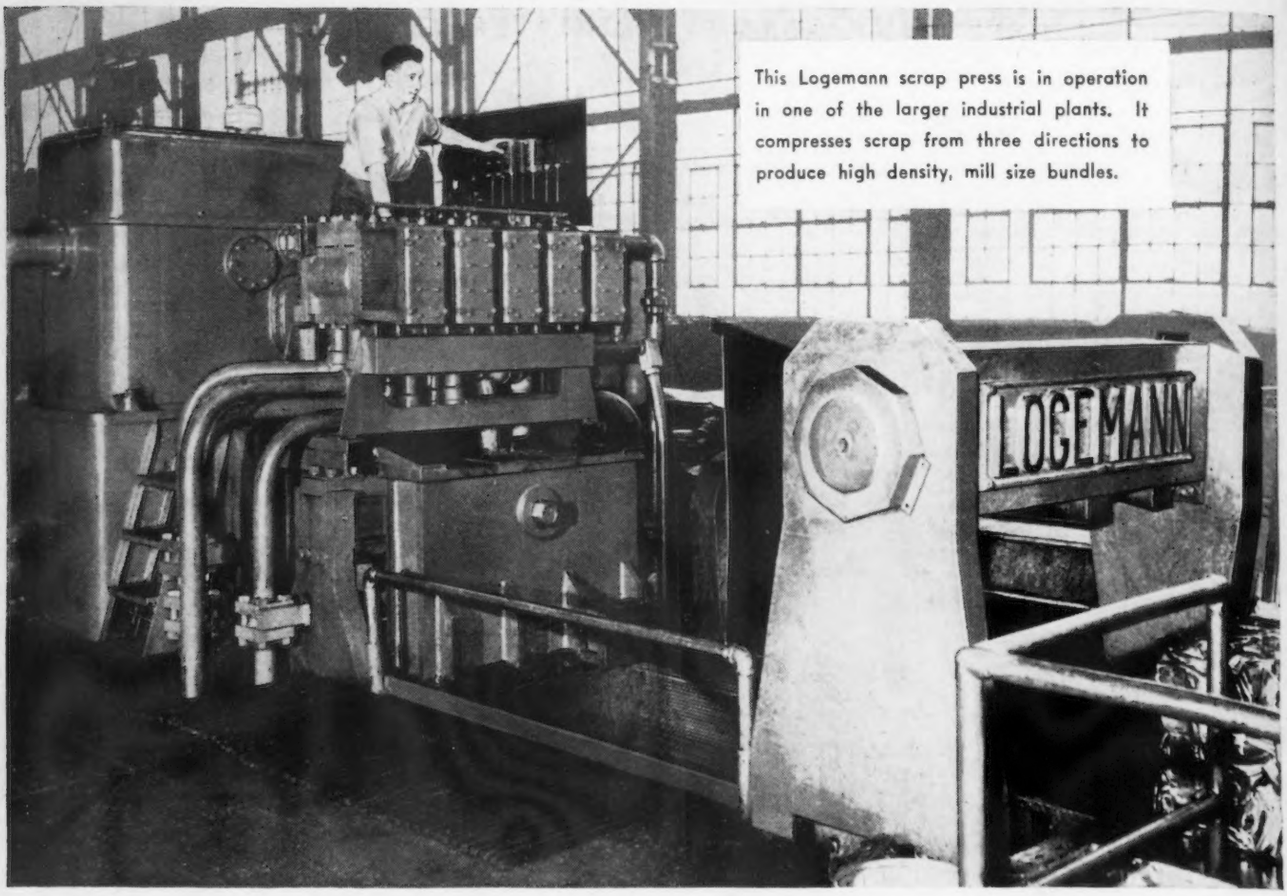
Block tin	63 —65
No. 1 pewter	48 —50
No. 1 auto babbitt	38 —40
Mixed common babbitt	11½—12
Solder joints	12 —13
Siphon tops	38 —39
Small foundry type	13 —13½
Monotype	12 —12½
Lino and stereotype	11½—12
Electrotype	9½—10
New type shell cuttings	11 —11½
Clean hand picked type shells	4½— 5
Lino and stereo dross	5 — 5½
Electro dross	3 — 3¼

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect Freight equalized with nearest free delivery point.

Full lead sheets	18.25
Cut lead sheets	18.75
Lead pipe, manufacturing point	17.50
Lead traps and bends	List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +42%
Lead wool	19.50



This Logemann scrap press is in operation in one of the larger industrial plants. It compresses scrap from three directions to produce high density, mill size bundles.

Self-contained . . . . . }
Triple Compression . . } **LOGEMANN**
Automatically Controlled } **SCRAP PRESSES**

handle high tonnages with minimum labor . . . *at low cost!*

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The compact unit illustrated is completely self-contained with oil tank and pump located directly over the press . . . utilizing the advantages of short pipe lines. Automatic controls, mounted in front of pump, give the operator full visibility at all times. Controls operate rams successively within a single rigid box. There is no complex construction which means there is *no need for specially-trained maintenance crews.*

Both two-ram and three-ram models are available with automatic controls or for manual manipulation.

Logemann Bros. Co. have specialized in the production of scrap metal presses for sheet mills, stamping plants, scrap yards, and metal manufacturing plants of all types for nearly 75 years. Write for full information—please state the nature of your scrap and tonnage.

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SCRAP

Market Remains Dull; Cast Grades Strong

New York

• • • **Continued hesitation** marked the steelmaking scrap grades at midweek, although increasing pressure in specialty grades has forced prices on those items up in some districts. Railroad items went up in the Philadelphia and St. Louis markets.

Although there were no price changes in heavy melting scrap grades, there was a generally strong undertone to all steel making grade prices. The past several weeks of comparatively stable prices have served to thoroughly test the market, and it is becoming increasingly apparent that no lower prices are to be expected in the near future.

There are reports from some districts that expanded shipments during the past two months have improved the gloomy seasonal stockpiling picture. Certain mills in the Buffalo district are in better shape in this respect than at the same time last year. Generally speaking, however, these gains are being offset by blast furnace repair programs which are eating dangerously into current scrap shipments.

Cast grades continue their upward swing, due to the general shortage of market pig iron. This pig iron shortage is of course attributable to reduced blast furnace output. No. 1 cupola cast was up 50¢ per ton in Philadelphia to $47.00 to $48.00, and up $2 in Detroit to $40.00 to $41.00.

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PITTSBURGH — Heavy melting steel scrap prices are unchanged here for the fourth consecutive week. Trade sources explain this—the longest period of steady prices since OPA days—by saying that the mills are very definitely resisting anything higher. The weakness which a few in the trade thought might develop because of the holdup in shipments to U. S. Steel Corp. plants has not developed though brokers say they are having less trouble covering orders. When awards on last week's rail list are known it is expected that some changes will be made in these grades.

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CHICAGO—For the past two weeks the market has seen a somewhat novel situation. Most brokers have been covering old orders at prices between $39.50 and $40.50. At the same time the mills have placed limited tonnages which are to be delivered at $39. No large sales have been made and broker buying has been keen, with the exception of railroad heavy melting, concerned only with taking spot offerings of cars already loaded. Mills continue to report that they are laying some scrap in inventory. Cast iron grades although still high have started to show indications of weakness.

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CLEVELAND — There has been no change in the market here or in the Valley, except in the foundry grades, which are growing steadily stronger. Despite the absence of consumer buying, there is a very strong undertone in the market produced in part by brokers' covering at prices higher than current quotations. While some consumers are in fairly strong inventory position and are getting shipments about equal to consumption, there is actually very little scrap around and much of the material moving at the moment stems from customer sources. Price testing will begin about the first of the month or shortly after, which, according to some observers, will add up to a demonstration of how to overcome the law of supply and demand.

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BOSTON—Yards generally are gambling on higher prices. Accumulations, however, are not large except in isolated cases. Steel mill buying has been lukewarm, thus the market for most kinds of scrap is uninteresting. Unprepared steel apparently is moved more frequently than prepared and some busheling finds a buyer. Slightly more activity is noted in the cast market with sales for outside New England delivery as well as inside.

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PHILADELPHIA — Heavy melting grades were held at the previous week's levels here last week although the market is firm and there is no indication of the prospect of any further price decline. Mills are reported to have bought during the week but the tonnages involved are small. There is no pressure on the part of dealers to sell short at current prices. Shipments have fallen well below recent levels and mill inventories are not what they should be to safeguard winter scrap reserves. Increases have been recorded in turnings, cast, railroad specialties and chemical borings.

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CINCINNATI—The market this week remains in about the same condition as last, with demands for all items strong. While some mills have shown a tendency to hold off, in view of high prices, most of them indicate that they are buying what they need, and are not allowing prices to hold them back; however they are not reaching out to any great distance for supplies.

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NEW YORK — The holiday period further dulled a lethargic market here. Indications are that the price No. 1 on heavy melting scrap is remaining firm at the $32 level which has prevailed for the past five weeks.

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DETROIT—Prices of most scrap classifications remain unchanged again this week although there is considerable speculation as to the ability of large mill buyers to obtain adequate supplies at the present price of $37 delivered for openhearth grades. It is expected that new contracts between the mills and their suppliers will be completed sometime this week covering the next 30 days.

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BUFFALO—The market was quiet but firmer this week, although prices were unchanged. Dealers' receipts have dropped about one third from the late August peak and doubt was expressed that any sizable tonnage could be purchased without raising bids. Removal of restrictions on shipments to a leading consumer, banking of a merchant iron stack for lack of coke, and reports that a steel mill blast furnace had been curtailed by mechanical difficulties in the past week helped to harden the undertone of steelmaking scrap.

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ST. LOUIS—Foundries have increased buying prices on the grades they use, and there also is a strong undertone to the melting grade market in the St. Louis industrial district, as other centers are again taking material away from the consumers here. The steel mills are consuming more than they are receiving, as is evidenced by their extending the time for fulfilling outstanding contracts expiring Sept. 5 and 15 to the end of this month.

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BIRMINGHAM—Mills in this area are obtaining their requirements but the scarcity of cast grades continues to be felt by the foundries. Practically all of the openhearth material available is originating from small industrial plants. Although prices are unchanged for another week, uncertainty over what may happen is not conducive to booming activity in the market.

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TORONTO—In the Canadian scrap iron and steel markets, general conditions showed little change for the week. Local dealers state that nothing definite has been established with regard to ceiling free iron scrap prices and there is a spread ranging anywhere from $35 to $40 per ton on consumers buying prices. However, only small lots of cast scrap are appearing on the market and the majority of small consumers are unable to obtain supplies, while the larger users are said to have fair stocks of cast, but no stove plate or malleable scrap.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.50 to $38.00
RR. hvy. melting	41.00 to 42.00
No. 2 hvy. melting	37.50 to 38.00
RR. scrap rails	45.50 to 46.00
Rails 2 ft. and under	48.75 to 49.25
No. 1 comp'd bundles	37.50 to 38.00
Hand bdld. new shts.	37.50 to 38.00
Hvy. axle turn.	36.00 to 37.00
Hvy. steel forge turn.	36.00 to 37.00
Mach. shop turn.	32.50 to 33.00
Shoveling turn.	34.50 to 35.00
Mixed bor. and turn.	32.50 to 33.00
Cast iron borings	33.50 to 34.00
No. 1 cupola cast	42.50 to 43.50
Hvy. breakable cast	37.00 to 37.50
Malleable	52.00 to 53.00
RR. knuck and coup.	47.50 to 48.00
RR. coil springs	47.50 to 48.00
RR. leaf springs	47.50 to 48.00
Rolled steel wheels	47.50 to 48.00
Low phos.	45.00 to 45.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.50 to $39.00
No. 2 hvy. melting	38.50 to 39.00
No. 1 bundles	38.50 to 39.00
No. 2 dealers' bundles	38.50 to 39.00
Bundled mach. shop turn.	38.50 to 39.00
Galv. bundles	36.50 to 37.00
Mach. shop turn.	33.50 to 34.00
Short shov. turn.	35.50 to 36.00
Cast iron borings	34.50 to 35.00
Mix. borings & turn.	33.50 to 34.00
Low phos, hvy. forge.	45.00 to 46.00
Low phos, plates	42.00 to 42.50
No. 1 RR. hvy. melt.	43.75 to 44.25
Rerolling rails	47.00 to 48.00
Miscellaneous rails	44.00 to 45.00
Angles & splice bars	47.00 to 47.50
Locomotive tires, cut	43.00 to 43.50
Cut bolster & side frames	45.00 to 46.00
Standard stl. car axles	49.00 to 50.00
No. 3 steel wheels	45.00 to 46.00
Couplers & knuckles	45.50 to 46.00
Rails 2 ft. and under	48.50 to 49.50
Malleable	61.00 to 62.00
No. 1 mach. cast.	49.00 to 50.00
No. 1 agricul. cast.	44.00 to 46.00
Hvy. breakable cast.	40.00 to 41.00
RR. grate bars	42.00 to 42.50
Cast iron brake shoes	44.00 to 44.50
Cast iron carwheels	42.50 to 43.50

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	38.00 to 39.00
Mach. shop turn.	28.50 to 29.00
Shoveling turn.	30.50 to 31.00
Cast iron borings	28.50 to 29.00
Mixed bor. & turn.	28.00 to 29.00
Low phos. plate	39.00 to 40.00
No. 1 cupola cast.	44.00 to 45.00
Hvy. breakable cast.	35.00 to 36.00
Scrap rails	39.00 to 40.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	29.50 to 30.00
Nos. 1 and 2 bundles	29.50 to 30.00
Busheling	29.50 to 30.00
Shoveling turn.	27.00 to 27.50
Machine shop turn.	25.00 to 25.50
Mixed bor. & turn.	25.00
Cl'n cast. chem. bor.	26.00 to 27.00
No. 1 machinery cast.	36.50 to 38.50
No. 2 machinery cast.	36.50 to 38.50
Heavy breakable cast.	35.00 to 36.50

DETROIT

Per gross ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	34.00 to 35.00
New busheling	34.00 to 35.00
Flashings	34.00 to 35.00
Mach. shop turn.	27.00 to 28.00
Shoveling turn.	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Mixed bor. & turn.	28.00 to 29.00
Low phos. plate	38.00 to 39.00
No. 1 cupola cast.	40.00 to 41.00
Hvy. breakable cast.	31.00 to 32.00
Stove plate	32.00 to 34.00
Automotive cast.	38.00 to 40.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$36.50 to $37.00
No. 2 hvy. melting	36.50 to 37.00
No. 1 bundles	36.50 to 37.00
No. 2 bundles	36.50 to 37.00
Mach. shop turn.	29.00 to 30.00
Shoveling turn.	29.00 to 30.00
Mixed bor. & turn.	29.00 to 30.00
Clean cast chemical bor.	34.50 to 36.00
No. 1 cupola cast.	47.00 to 48.00
Hvy. breakable cast.	44.00 to 45.00
Cast. charging box.	44.00 to 45.00
Clean auto cast.	47.00 to 48.00
Hvy. axle forge turn.	36.50 to 37.50
Low phos. plate	41.00 to 42.00
Low phos. punchings	41.00 to 42.00
Low phos. bundles	40.00 to 41.00
RR. steel wheels	45.00 to 46.00
RR. coil springs	45.00 to 46.00
RR. malleable	58.00 to 60.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	38.50 to 39.50
Bundled sheets	38.50 to 39.50
Mach. shop turn.	30.00 to 31.00
Locomotive tires, uncut	42.00 to 43.00
Mis. std. sec. rails	43.00 to 44.00
Rerolling rails	46.50 to 47.50
Steel angle bars	44.00 to 45.00
Rails 3 ft. and under	46.00 to 47.00
RR. steel springs	45.00 to 46.00
Steel car axles	45.00 to 46.00
Grate bars	37.00 to 38.00
Brake shoes	39.00 to 40.00
Malleable	59.00 to 61.00
Cast iron car wheels	42.50 to 43.50
No. 1 machinery cast	43.00 to 44.00
Hvy. breakable cast.	38.00 to 39.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	34.00 to 35.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	34.00 to 35.00
Long turnings	23.00 to 24.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	24.00 to 25.00
Bar crops and plate	38.00 to 38.50
Structural and plate	38.00 to 38.50
No. 1 cupola cast.	44.00 to 45.00
Stove plate	42.00 to 42.50
No. 1 RR. hvy. melt.	36.00 to 37.00
Steel axles	38.00 to 39.00
Scrap rails	37.50 to 38.00
Rerolling rails	38.50 to 39.00
Angles & splice bars	38.50 to 39.00
Rails 3 ft. & under	38.50 to 39.00
Cast iron carwheels	35.00 to 36.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	39.50 to 40.00
Mach. shop turn.	33.00 to 34.00
Short shov. turn.	34.00 to 35.00
Cast iron borings	33.00 to 34.00
Low phos.	44.00 to 45.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	32.00
No. 2 bundles	32.00
Comp. galv. bundles	30.00
Mach. shop turn.	25.00 to 26.00
Mixed bor. & turn.	25.00 to 26.00
Shoveling turn.	27.00 to 28.00
No. 1 cupola cast.	39.00 to 40.00
Hvy. breakable Cast.	39.00 to 40.00
Charging box cast.	39.00 to 40.00
Stove plate	39.00 to 40.00
Clean auto cast.	39.00 to 40.00
Unstrip. motor blks.	36.50 to 37.50
Cl'n chem. cast bor.	27.00 to 28.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	37.00 to 38.00
No. 2 bundles	37.00 to 38.00
No. 1 busheling	37.00 to 38.00
Mach. shop turn.	28.00 to 29.00
Shoveling turn.	30.00 to 31.00
Cast iron borings	28.00 to 29.00
Mixed bor. & turn.	28.00 to 29.00
No. 1 cupola cast.	40.00 to 42.00
Charging box cast.	36.00 to 38.00
Stove plate	39.00 to 40.00
Clean auto cast.	40.00 to 42.00
Small indl. malleable	39.00 to 41.00
RR. malleable	46.00 to 52.00
Low phos. plate	40.00 to 41.00
Scrap rails	40.00 to 41.00
Rails 3 ft. & under	44.00 to 45.00
RR. steel wheels	42.00 to 43.00
Cast iron carwheels	42.00 to 43.00
RR. coil & leaf spgs.	42.00 to 43.00
RR. knuckles & coup.	42.00 to 43.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.00 to $38.50
No. 2 hvy. melting	38.00 to 38.50
No. 1 bundles	38.00 to 38.50
No. 2 bundles	38.00 to 38.50
No. 1 busheling	38.00 to 38.50
Drop forge flashings	38.00 to 38.50
Mach. shop turn.	31.50 to 32.00
Shoveling turn.	32.50 to 33.00
Steel axle turn.	38.00 to 38.50
Cast iron borings	32.50 to 33.00
Mixed bor. & turn.	32.50 to 33.00
Low phos.	41.00 to 42.00
No. 1 machinery cast.	47.00 to 47.50
Malleable	54.00 to 55.00
RR. Cast.	47.00 to 47.50
Railroad grate bars	42.00 to 44.00
Stove plate	42.00 to 44.00
RR. hvy. melting	40.50 to 41.00
Rails 3 ft. & under	47.00 to 48.00
Rails 18 in. & under	48.00 to 49.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point

No. 1 hvy. melting	$22.00
No. 2 hvy. melting	22.00
No. 2 bales	22.00

Per gross ton delivered to consumer

No. 3 bales	$16.50
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	26.00
No. 1 cupola cast.	$32.00 to 33.00
RR. hvy. melting	23.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.50
No. 2 hvy. melting	22.50
No. 1 bales	22.50
No. 2 bales	22.50
No. 3 bales	16.00
Mach. shop turn.	14.50
No. 1 cupola cast.	$32.00 to 33.00
RR. hvy. melting	23.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. hvy. melt.	$20.00 to $22.00
Elec. furn. 1 ft. und.	$25.50 to 27.00
No. 1 cupola cast.	29.00
RR. hvy. melting	23.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast.	35.00 to 40.00
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

* Ceiling price.

Comparison of Prices . .

Advances over past week in **Heavy Type**, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Sept. 16, 1947	Sept. 9, 1947	Aug. 19, 1947	Sept. 17, 1946
Hot-rolled sheets	2.80	2.80	2.80	2.425
Cold-rolled sheets	3.55	3.55	3.55	3.275
Galvanized sheets (10 ga.)	3.95	3.95	3.95	4.05*
Hot-rolled strip	2.80	2.80	2.80	2.45
Cold-rolled strip	3.55	3.55	3.55	3.05
Plates	2.95	2.95	2.95	2.50
Plates wrought iron	6.85	6.85	6.85	4.112
Stain's c-r strip (No. 302)	30.30	30.30	30.30	30.30
*24 gage				
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	**$5.75**	**$5.75**	**$5.75**	**$5.00**
Tinplate, electro (0.50 lb)	**5.05**	**5.05**	**5.05**	**4.50**
Special coated mfg. ternes	**4.90**	**4.90**	**4.90**	**4.30**
Bars and Shapes: (cents per pound)				
Merchant bars	2.90	2.90	2.90	2.50
Cold-finished bars	3.55	3.55	3.55	3.10
Alloy bars	3.30	3.30	3.30	2.92
Structural shapes	2.80	2.80	2.80	2.35
Stainless bars (No. 302)	26.00	26.00	26.00	25.97
Wrought iron bars	7.15	7.15	7.15	4.76
Wire and Wire Products: (cents per pound)				
Bright wire	3.55	3.55	3.55	3.05
Wire nails	4.25	4.25	4.25	3.75
Rails: (dollars per 100 lb)				
Heavy rails	$2.75	$2.75	$2.75	$43.39*
Light rails	2.85	2.85	2.85	49.18*
*per net ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$45.00	$45.00	$45.00	$39.00
Sheet bars	66.00	66.00	66.00	38.00
Slabs, rerolling	45.00	45.00	45.00	39.00
Forging Billets	55.00	55.00	55.00	47.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	58.43
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.80	2.80	2.80	2.30
Skelp	2.60	2.60	2.60	2.05

Pig Iron: (per gross ton)	Sept. 16, 1947	Sept. 9, 1947	Aug. 19, 1947	Sept. 17, 1946
No. 2, foundry, Phila.	$41.22	$41.22	$41.22	$30.43
No. 2, Valley furnace	36.50	36.50	36.50	28.50
No. 2, Southern Cin'ti	39.75	39.75	39.75	27.80
No. 2, Birmingham	34.88	34.88	34.88	24.88
No. 2, foundry, Chicago†	36.00	36.00	36.00	28.50
Basic del'd Philadelphia	40.72	40.72	40.72	29.93
Basic, Valley furnace	36.00	36.00	36.00	28.00
Malleable, Chicago†	36.50	36.50	36.50	28.50
Malleable, Valley	36.50	36.50	36.50	28.50
Charcoal, Chicago	49.49	49.49	49.49	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$37.75	$37.75	$38.00	$20.00
Heavy melt'g steel, Phila.	36.75	36.75	37.00	18.75
Heavy melt'g steel, Ch'go	38.75	38.75	38.75	18.75
No. 1, hy. comp. sheet, Det.	34.50	34.50	34.50	17.32
Low phos. Youngs'n	44.50	44.50	44.50	22.50
No. 1, cast, Pittsburgh	43.00	43.00	42.50	25.00
No. 1, cast, Philadelphia	47.50	47.00	47.00	25.00
No. 1, cast, Chicago	49.50	49.50	47.50	25.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$12.00	$12.00	$12.00	$8.75
Foundry coke, prompt	13.75	13.75	13.75	8.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	21.50	21.50	21.50	14.375
Copper, Lake, Conn.	21.625	21.625	21.625	14.375
Tin, Straits, New York	80.00	80.00	80.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	14.80	14.80	14.80	8.10
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	37.67	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Sept. 16, 1947	3.19141¢ per lb.	$36.93 per gross ton	$37.75 per gross ton
One week ago	3.19141¢ per lb.	$37.08 per gross ton	$37.75 per gross ton
One month ago	3.19141¢ per lb.	$37.35 per gross ton	$37.92 per gross ton
One year ago	2.70711¢ per lb.	$28.13 per gross ton	$19.17 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1947	3.19141¢ Aug. 5	2.87118¢ Jan. 7	$37.35 Aug. 19	$30.14 Jan. 7	$41.67 Aug. 5	$29.50 May 20
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25c above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 20,000 lb to 89,999 lb. (9) Carload lot in manufacturing trade. (10) Delivered Los Angeles only. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only: Includes 3 pct freight tax. (14) Delivered Kaiser Co. prices: includes 3 pct freight tax. (15) to 0.035 to 0.075 in. thick by ¾ to 3½ in. wide. (16) Spot market as high as $92 gross ton. (17) Delivered Los Angeles: add ½c per 100 lb for San Francisco. (18) Slab prices subject to negotiation in most cases. Some producers charge (19) $2 more, (21) $1 more. Some producers charge (22) 0.05¢ less, (23) 0.10¢ less, (24) 0.20¢ less.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		San Franc'co, Los Angeles, Seattle	DELIVERED TO Detroit	New York	Philadelphia
INGOTS															
Carbon, rerolling	($36.00 f. o. b. mill) (Spot market as high as $80 gross ton)														
Carbon, forging	$46.00														
Alloy	$56.00									(Canton = $56.00)					
BILLETS, BLOOMS, SLABS															
Carbon, rerolling [18]	$45.00[19]	$45.00[19]	$45.00[19]	$47.00	$45.00[19]	$45.00[19]							$48.00[19]		
Carbon, forging billets	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00							$58.00		
Alloy	$66.00	$66.00				$66.00	(Bethlehem, Massillon, Canton = $66.00)						$69.00		
SHEET BARS[16]							$66.00								
PIPE SKELP	2.60¢[21]	2.65¢					2.60¢[21]	2.60¢[21]							
WIRE RODS	2.80¢[21]	2.80¢[21]		2.80¢[21]	2.85¢		(Worcester = 2.90¢[21])					3.52¢[13]			
SHEETS															
Hot-rolled	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	3.175¢	(Ashland, Ky. = 2.80¢)		3.54[17]¢	2.95¢	3.09¢	3.09¢
Cold-rolled[1]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢		3.65¢	3.55¢			3.70¢	3.96¢	3.93¢
Galvanized (10 gage)	3.95¢[23]	3.95¢[23]	3.95¢[23]		3.95¢[23]		3.95¢	3.95¢	4.05¢	(Ashland ,Ky. = 3.95¢)		4.62¢[17]		4.14¢	4.05¢
Enameling (12 gage)	3.95¢[22]	3.95¢[22]	3.95¢[22]	3.95¢			3.95¢		4.05¢	3.95¢			4.10¢[22]	4.38¢	4.33¢
Long ternes [2] (10 gage)	4.05¢[24]	4.05¢[24]	3.85¢											4.45¢	4.41¢
STRIP															
Hot-rolled [3]	2.80¢	2.80¢	2.80¢	2.80¢[15]	2.80¢		2.80¢					3.60¢[17]	2.95¢	3.23¢	3.18¢
Cold-rolled [4]	3.55¢	3.65¢		3.55¢			3.55¢			(Worcester = 3.75¢)			3.70¢	3.98¢	3.93¢
Cooperage stock	3.10¢	3.10¢			3.10¢		3.10¢							3.39¢	
TINPLATE															
Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85		(Warren, Ohio = $5.75)			$6.175	$6.062[11]
Electro, box 0.25 lb.	Deduct 90¢ from standard coke base box price.														
Electro, box 0.50 lb.	Deduct 70¢ from standard coke base box price.														
Electro, box 0.75 lb.	Deduct 50¢ from standard coke base box price.														
BLACKPLATE, 29 gage[5]	3.90¢	3.90¢	3.90¢		4.00¢			4.00¢	4.00¢					4.29¢	4.20¢
BLACKPLATE, CANMAKING															
55 lb. to 70 lb.	Deduct $1.55 from standard coke base box.														
75 lb. to 95 lb.	Deduct $1.65 from standard coke base box.														
100 lb. to 118 lb.	Deduct $1.55 from standard coke base box.														
TERNES, MFG., Special coated	Deduct 85¢ from standard coke base box price.														
BARS															
Carbon steel	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢					3.625¢[17]	3.05¢	3.31¢	3.28¢
Rail steel[6]	Subject to negotiation because of fluctuating scrap prices.														
Reinforcing (billet)[7]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢				3.325¢[17]		3.04¢	2.95¢
Reinforcing (rail)	Subject to negotiation because of fluctuating scrap prices.														
Cold-finished[8]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢							3.70¢	3.96¢	3.93¢
Alloy, hot-rolled	3.30¢	3.30¢				3.30¢	3.30¢	(Bethlehem, Massillon, Canton = 3.30¢)					3.45¢		3.44¢
Alloy, cold-drawn	4.10¢	4.10¢	4.10¢	4.10¢		4.10¢							4.25¢		
PLATE															
Carbon steel[12]	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢		2.95¢	(Coatesville = 3.15¢, Claymont = 3.15¢, Geneva, Utah = 3.125¢) 2.95¢				3.76¢[14]		3.24¢	3.15¢
Floor plates	4.20¢	4.20¢												4.60¢	4.58¢
Alloy	3.80¢	3.80¢			(Coatesville = 4.50¢)									4.02¢	3.895¢
SHAPES, Structural	2.80¢	2.80¢	2.80¢		2.80¢	2.80¢	(Geneva, Utah = 2.975¢, Bethlehem = 2.80¢)					3.43¢[10]		3.00¢	2.94¢
SPRING STEEL, C-R															
0.26 to 0.40 carbon	3.20¢			3.20¢			(Worcester = 3.40¢)								
0.41 to 0.60 carbon	4.70¢			4.70¢			(Worcester = 4.90¢)								
0.61 to 0.80 carbon	5.30¢			5.30¢			(Worcester = 5.50¢)								
0.81 to 1.00 carbon	6.80¢			6.80¢			(Worcester = 7.00¢)								
Over 1.00 carbon	9.10¢			9.10¢			(Worcester = 9.30¢)								
MANUFACTURERS' WIRE[9]															
Bright	3.55¢	3.55¢		3.55¢	3.55¢		(Worcester = 3.65¢, Duluth = 3.60¢)					4.56¢[13]		3.96¢	3.93¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.60¢	4.60¢		4.60¢	(Worcester = 4.70¢, Duluth = 4.85¢) (Trenton = 4.85¢)							5.28¢[13]		4.66¢	4.595¢
PILING, Steel sheet	3.30¢	3.30¢				3.30¢								3.71¢	3.68¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt	Subject to negotiation			Subject to negotiation		
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	Subject to negotiation			Subject to negotiation		
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton (4 to 6 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	Cr	V	Mo	Co	Base Per lb
18	4	1	—	—	82¢
18	4	1	—	5	$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢

High-carbon-chromium*	47¢
Oil hardening manganese*	26¢
Special carbon*	24¢
Extra carbon*	20¢
Regular carbon*	17¢

Warehouse prices on and east of Mississippi are 2¢ per lb. higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.50¢
Armature	4.80¢
Electrical	5.30¢
Motor	6.05¢
Dynamo	6.75¢
Transformer 72	7.25¢
Transformer 65	7.95¢
Transformer 58	8.65¢
Transformer 52	9.45¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.75
Angle splice bars, 100 lb	3.25
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$3.10
Light rails (from rail steel), f.o.b. Williamsport, Pa.	3.45

	Base per lb
Cut spikes	4.85¢
Screw spikes	6.90¢
Tie plate, steel	3.05¢
Tie plates, Fittsburg, Calif.	3.20¢
Track bolts	7.00¢
Track bolts, heat treated, to rail roads	7.25¢

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio; Weirton, W. Va.; St. Louis, Kansas City, Minnequa, Colo.; Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa.; Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa.; Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$7.05	$14.10

CLAD STEEL

Base prices, cents per pound

Stainless-clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	....
Monel-clad 10 pct, f.o.b. Coatesville	29.00	....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg	Delivered San Francisco
Standard & coated nails	$4.25†	$5.33
Galvanized nails‡‡	4.00†	5.08
Cut nails, carloads, Pittsburgh base	5.80*	....

†10¢ additional at Cleveland, 35¢ at Worcester. ‡‡ Plus $2.75 per 100 lb galvanizing extra. *Less 20¢ to jobbers.

	Base per 100 lb	
Annealed fence wire	$4.20‡	$5.21
Annealed galv. fence wire	4.65‡	5.66

‡10¢ additional at Worcester.

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham

	Base	column
Woven wire fence*	91	114
Fence posts, carloads	90††	...
Single loop bale ties	91	115
Galvanized barbed wire**	101	121
Twisted barbless wire	101	...

* 15½ gage and heavier. ** On 80-rod spools in carload quantities. ††Pittsburgh, Duluth.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Alde-cor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55
Sheets									
Hot-rolled	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30
Cold-rolled	5.30	5.30	5.30	....	5.30	5.30	5.30	5.30	5.30
Galvanized	....	5.85	....	....	....	6.00	....	....	....
Strip									
Hot-rolled	4.30	4.30	4.30	....	4.30	4.30	4.30	4.30	4.30
Cold-rolled	....	....	5.30	....	....	5.30	5.30	5.30	5.30†
Shapes	....	4.30	....	....	4.30	4.30	4.30	4.30	....
Beams	....	4.30	....	....	....	4.30	....	....	....
Bars									
Hot-rolled	4.45	4.45	4.45	....	....	4.45	4.45	4.45	4.45
Cold-rolled	....	....	....	....	....	....	....	....	....
Bar shapes	....	4.45	....	....	4.45	4.45	4.45	4.45	....

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts. f.o.b. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only
Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
⅛-in.	50½	34½
¼-in.	53½	38½
1-in.	56	41½
1¼-in.	56½	42
1½-in.	57	42½
2 in.	57½	43
2½ and 3-in.	58	43½
Wrought Iron, buttweld		
⅛-in.	+ 7	+29
¼-in.	2½	+19
1 and 1¼-in.	8	+11
1½-in.	13½	+ 7½
2-in.	14	+ 7
Steel, lapweld		
2-in.	49	34
2½ and 3-in.	52	37
3½ to 6-in.	54	39
Steel, seamless		
2-in.	48	33
2½ and 3-in.	51	36
3½ to 6-in.	53	38
Wrought Iron, lapweld		
2-in.	5½	+14½
2½ to 3½-in.	8	+10½
4-in.	12	+ 5
4½ to 8-in.	10	+ 6½

Extra Strong, plain ends

Steel, buttweld		
⅛-in.	49½	35
¼-in.	53½	39
1-in.	55½	42
1¼-in.	56	42½
1½-in.	56½	43
2-in.	57	43½
2½ and 3-in.	57½	44
Wrought Iron, buttweld		
⅛-in.	+ 2½	+23
¼-in.	3½	+17
1 to 2-in.	13	+ 7
Steel, lapweld		
2-in.	48	34
2½ and 3-in.	52	38
3½ to 6-in.	55½	41½
Steel, seamless		
2-in.	47	33
2½ and 3-in.	51	37
3½ to 6-in.	54½	40½
Wrought Iron, lapweld		
2-in.	8½	+11
2½ to 4-in.	17½	+ ½
4½ to 6-in.	13	+ 5

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

		Seamless		Electric Weld	
OD	Gage	Hot-	Cold-	Hot-	Cold-
in.	BWG	Rolled	Drawn	Rolled	Drawn
2	13	$16.67	$19.99	$16.17	$19.39
2½	12	22.42	26.87	21.75	26.06
3	12	24.93	29.90	24.18	29.00
3½	11	31.17	37.39	30.23	36.27
4	10	38.69	46.38	37.53	44.99

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in. del'd Chicago	$85.06
6-in. to 24-in. del'd New York	83.30
6-in. to 24-in., Birmingham	74.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less	98.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	48
9/16 & ⅝ in. x 6 in. & shorter	50
All larger diam and longer lengths	47
Lag, all diam over 6 in. long	48
Lag, all diam x 6 in. & shorter	50
Plow bolts	57

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	48
9/16 to 1 in. inclusive	47
1⅛ to 1½ in. inclusive	45
1⅝ in. and larger	40

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	USS	SAE
Base discount less case lots		
7/16 in. and smaller		51
½ in. and smaller	50	..
½ in. through 1 in.		48
9/16 in. through 1 in.	49	..
1⅛ in. through 1½ in.	47	46
1⅝ in. and larger	40	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts	*Consumer*
Packages, nuts separate	65 and 10
In bulk	75

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets (½ in. and larger)	*Base per 100 lb*
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$5.25
F.o.b. Lebanon, Pa.	5.40

Small Rivets (7/16 in. and smaller)	*Percent Off List*
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55 and 5

Cap and Set Screws (In packages)	*Percent Off List Consumer*
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	56
¾ to 1 in. x 6 in., SAE 1035, heat treated	47
Set screws, cup and oval points	61
Milled studs	33
Flat head cap screws, listed sizes	21
Fillister head cap, listed sizes	40

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports*)

	Per Gross Ton
Old range, bessemer	$5.95
Old range, nonbessemer	5.80
Mesabi, bessemer	5.70
Mesabi, nonbessemer	5.55
High phosphorus	5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	24¢ to 28½¢
Copper, electrolytic, 100 and 325 mesh	30¢ to 31½¢
Copper, reduced, 150 and 200 mesh	29¢ to 30½¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe carlots	10¢ to 17¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags	7.4¢ to 8.5¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	63¢ to 80¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	35¢ to 37¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	29¢ to 32¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	23¢ to 26¢
Antimony, 100 mesh	36.05¢
Cadmium, 100 mesh	$2.00
Chromium, 100 mesh and finer	$1.025
Lead, 100, 200, & 300 mesh 18.50¢ to	23.50¢
Manganese, minus 325 mesh and coarser	49¢
Nickel, 100 mesh	51½¢
Silicon, 100 mesh	26¢
Solder powder, 100 mesh	8½¢ plus metal
Stainless steel, 302, minus 100 mesh	75¢
Tin, 100 mesh	90¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$3.05
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.	$2.65
Under 100 lb	$2.90

COKE

Furnace, beehive (f.o.b. oven) Net Ton	
Connellsville, Pa.	$11.50 to $12.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	13.00 to 14.50
Foundry, Byproduct	
Chicago, del'd	$17.10
Chicago, f.o.b.	16.10
New England, del'd	19.50
Seaboard, Kearney, N. J., f.o.b.	17.85
Philadelphia, f.o.b.	16.75
Swedeland, Pa., f.o.b.	16.75
Buffalo, del'd	18.25
Ashland, Ohio, f.o.b.	15.50
Painesville, Ohio, f.o.b.	16.60
Erie, del'd	16.75
Cleveland, del'd	17.90
Cincinnati, del'd	15.39
St. Louis, del'd	18.03
Birmingham, del'd	15.00

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	*Carloads, Per 1000*
No. 1, Ohio	$64.00
First quality, Pa., Md., Ky., Mo., Ohio	70.00
First quality, New Jersey	75.00
Sec. quality, Pa., Md., Ky., Mo, Ohio	64.00
Sec. quality, New Jersey	69.00
No. 2, Ohio	56.00
Ground fire clay, net ton, bulk	10.00

Silica Brick	
Pennsylvania and Birmingham	$70.00
Chicago District and Alabama	79.00
Silica cement, net ton (Eastern)	12.00
East Chicago	13.00

Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$59.00

Magnesite Brick	
Standard, Balt. and Chester	$81.00
Chemically bonded, Baltimore	70.00

Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in bulk	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	24.00
in sacks	28.00

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest; add 10¢; Missouri Valley; add 20¢ .. 10.55

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.44	$5.18	$5.69	$4.73	$5.28	$4.79	$4.52	$4.78	$5.48	$8.32	$8.42	$9.83	$9.93
New York	4.67	5.67[1]	6.07	4.97	5.80	5.02	4.72	4.97	5.52	8.37	8.47	9.87	9.97
Boston	4.70	5.57[12]	5.50[12]	4.70	6.71	5.05	4.77	4.92	5.57	8.57	8.67	9.92	10.02
Baltimore	4.29	....	5.54	4.70	....	4.74	4.64	4.75	5.45	....	....	....	....
Norfolk	4.75	....	....	5.15	....	5.00	5.00	5.05	5.85	....	....	....	....
Chicago	4.25	5.10	5.65	4.35	5.45	4.60	4.40	4.40	5.10	8.05	8.15	9.30	9.40
Milwaukee	4.399	5.249[1]	5.799	4.499	5.599	4.749	4.549	4.549	5.249	8.349	8.449	9.599	9.699
Cleveland	3.95	4.55	5.238	4.188	5.00	4.25†	4.311	4.10	4.95	8.308	8.408	9.30	9.40
Buffalo	4.25	5.10	5.90	4.60	5.61[5]	4.85	4.40	4.40	4.95	8.05	8.15	9.30	9.40
Detroit	4.35	5.20	5.97	4.64	5.59	4.84†	4.72	4.50	5.22	8.46	8.56	9.69	9.79
Cincinnati	4.471	5.166	5.166	4.694	....	4.903	4.744	4.703	5.403	....	....	....	....
St. Louis	4.549	5.399[1]	5.974	4.649	5.774	4.899	4.699	4.699	5.424	8.524	8.624	9.774	9.874
Pittsburgh	4.25	5.10[1]	5.65	4.35	4.95	4.80	4.40	4.40	4.95	8.05	8.15	9.30	9.40
St. Paul	4.584[7]	5.434[1]	5.834[2]	4.684[7]	....	4.884[7]	4.734[7]	4.734[7]	4.826[6]	....	....	....	....
Omaha	4.868	6.118[1]	6.468	5.168	....	5.418	5.218	5.218	5.918	....	....	....	....
Indianapolis	4.51	5.29	5.84	4.61	5.46	4.86	4.66	4.65	5.36	....	....	....	....
Birmingham	4.45[11]	....	5.65	4.45[11]	....	4.65[11]	4.40[11]	4.40[11]	5.93	....	....	....	....
Memphis	4.82[11]	5.88[11]	6.37	5.02[11]	....	5.17[11]	4.97[11]	4.97[11]	5.88	....	....	....	....
New Orleans	*4.98[11]	6.29[1]	....	5.18[11]	....	5.33[11]	*5.03[11]	*5.13[11]	6.29[6]	....	....	....	....
Houston	5.30	....	6.60	5.25	....	5.35	5.15	5.30	6.60	8.75[16]	8.85[16]	9.70[16]	9.80[16]
Los Angeles	5.65	7.35[1]	7.10	5.95	8.70[5]	5.40	5.50	5.40	7.25[14]	9.90[15]	9.60[15]	11.35[15]	11.35[1]
San Francisco	5.20[8]	6.65	6.85	5.50[8]	....	5.30	5.20	5.05	7.35[10]	....	....	....	....
Seattle	5.30[4]	7.10[1]	6.70[2]	5.60[4]	....	5.45[4]	5.25[4]	5.45[4]	7.45[14]	....	9.75[6]	....	11.10[6]
Portland	5.30[4]	....	6.70	5.60[4]	....	5.45[4]	5.25[4]	5.55[4]	7.45[14]	....	....	....	....
Salt Lake City	6.25	....	7.50	6.75	....	6.10	6.25	6.35	7.40	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 450 to 1499 lb; (10) 500 to 999 lb; (11) 400 to 399 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to ¾ in. thick and 90 in. wide.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	37.00	37.50	38.00	38.50	.....	Boston	Everett	$0.50 Arb.	.....	45.50	46.00	.....	.....
Birdsboro	40.00	40.50	41.00	41.50	45.00	Boston	Steelton	4.82	.....	.....	.....	.....	46.82
Birmingham	32.88–35.88	33.38–36.38	.....	.....	.....	Brooklyn	Bethlehem	3.00	40.00	40.50	41.00	41.50	.....
						Brooklyn	Birdsboro	3.50	.....	.....	.....	.....	48.50
Buffalo	38.00–37.50*	38.00–38.00*	36.50–38.50*	.....	.....	Cincinnati	Birmingham	4.87	37.75–40.75	38.25–41.25	.....	.....	.....
Chicago	35.50	36.00	36.50	37.00	.....	Jersey City	Bethlehem	1.84	38.84	39.34	39.84	40.34	.....
Cleveland	35.50–38.25*	36.00–38.75*	36.50–39.25*	.....	.....	Jersey City	Birdsboro	2.33	.....	.....	.....	.....	47.33
						Los Angeles	Provo	5.94	42.94	43.44	.....	.....	.....
Duluth	36.00	36.50	37.00	37.50	.....	Mansfield	Cleveland-Toledo	2.33	37.83–40.58*	38.33–41.08*	38.83–41.58*	39.33	.....
Erie	35.50	36.00	36.50	37.00	.....								
Everett	.....	45.00	45.50	.....	.....	Philadelphia	Bethlehem	1.67	38.67	39.17	39.67	40.17	.....
Granite City	36.50	37.00	37.00	.....	.....	Philadelphia	Swedeland	1.01	42.01	42.51	43 01	43.51	.....
Neville Island	36.00	36.50	36.50	37.00	.....	Philadelphia	Birdsboro	1.49	41.49	41.99	42.49	42.99	46.49
Provo	37.00	37.50	.....	.....	.....	Philadelphia	Steelton	2.16	39.16	.....	.....	.....	44.16
Sharpsville	36.00	36.50	36.50	37.00	.....	San Francisco	Provo	5.94	42.94	43.44	.....	.....	.....
Steelton	37.00	.....	.....	.....	42.00	Seattle	Provo	5.94	42.94	43.44	.....	.....	.....
Struthers, Ohio	36.50	.....	.....	.....	.....	St. Louis	Granite City	0.75 Arb.	37.25	37.75	37.75	.....	.....
Swedeland	41.00	41.50	42.00	42.50	.....								
Toledo	35.50	36.00	36.50	37.00	.....								
Troy, N. Y.	37.00	37.50	38.00	38.50	42.00								
Youngstown	36.00	36.50	36.50	37.00	.....								

* Republic Steel Corp. price. Basis: Average price of No. 1 hvy. mlt. steel scrap at Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$45.50; f.o.b. Buffalo — $46.75. Add $1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorous $44.00 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, $49.49. High phosphorous charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	157.00
Delivered Pittsburgh	140.25

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	7.00	7.25	7.80
Ton lots	8.00	8.60	10.50
Less ton lots	8.40	9.00	10.90

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$46.00	$47.00
F.o.b Pittsburgh	50.00	51.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.06% max. C, 0.06% P, 90% Mn	21.00	22.10	22.70
0.10% max. C	20.50	21.60	22.20
0.15% max. C	20.00	21.10	21.70
0.30% max. C	19.50	20.60	21.20
0.50% max. C	19.00	20.10	20.70
0.75% max. C, 7.00% max. Si	16.00	17.10	17.70

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.65
Ton lots	7.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	6.75
Ton lots	7.75
Less ton lots	8.15

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $69.00 f.o.b. Keokuk, Iowa; $73.75 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add 50¢ per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	16.50	17.85	19.60
97% Si, 1% Fe	16.00	18.25	20.00

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk	4.25	4.50	4.70
Ton lots	5.25	5.85	6.15
Less ton lots	5.65	6.25	6.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	15.00	15.65	15.90
50% Si	7.80	8.30	8.50
75% Si	10.00	10.30	11.05
80-90% Si	11.30	11.60	12.35
90-95% Si	12.80	13.10	13.80

Ferrochrome (65-72% *Cr, 2% max. Si*)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.75	22.15	22.25
0.50% C	21.50	21.90	22.00
1.00% C	21.00	21.40	21.50
2.00% C	20.50	20.90	21.00
65-69% Cr, 4-9% C	15.60	16.00	16.15
62-66% Cr. 4-6% C. 6-9% Si.	16.60	17.00	17.15

Briquets — Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.85	10.10	10.20
Ton lots	10.75	11.65	12.25
Less ton lots	11.15	12.05	12.65

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chrominum contained, lump sie, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	16.70	17.10	17.25
Ton lots	17.90	19.20	20.00
Less ton lots	18.60	19.90	20.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	21.00	21.40	21.50
Ton lots	22.35	23.00	24.20
Less ton lots	23.35	24.00	25.20

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	14.00	14.50	16.55
Ton lots	16.10	16.85	19.00
Less ton lots	17.10	17.85	20.00

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	17.60	18.45	20.20
Less ton lots	18.60	19.45	21.20

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings	Distilled
Ton lots	$1.60	$2.35	$2.95
Less ton lots	1.95	2.70	3.75

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr. 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	16.00	17.10	19.05
Less ton lots	16.75	17.85	19.80

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	14.25	15.35	17.30
Less ton lots	15.00	16.10	18.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa. York, Pa., per pound contained W, 5 ton lots, freight allowed	$2.50
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb	
Ton lots	$2.50
Less ton lots	$2.55
Ferromolybdenum, 55-75%, f.o.b Langeloth, Washington, Pa., per pound contained Mo.	95¢
Calcium molybdate, 40-45%, f.o.b Langeloth, Washington, Pa., Per pound contained Mo.	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo.	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y. ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High carbon ferotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$142.50
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., $3 unitage per gross ton	$65.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	17.00¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	5.50¢
Alsifer, 20% Al, 40% Si, 40% Ft, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	6.50¢
Ton lots	7.00¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	9.00¢
Ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17-50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese — Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.	
Carload lots	35¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b., Suspension Bridge, N. Y., freight allowed, Ti 15—17%, B 0.90—1.15%, Si 2.5—3.0% Al 1.0—2.0%.	
Ton lots, per pound	8.0¢

other development that could add substantially to the residential demand is the heat pump. It has been estimated that in the average home the heat pump will consume from 4000 to 9000 kw-hr annually, depending on location and temperature requirements.

Despite the fact that electric power production has increased 75 pct since 1939, generating capacity has expanded only 29 pct, and the margin of reserve capacity has declined from 35 to 12 pct. To meet the indicated large increase in demand for electricity and to widen the margin of reserve capacity, the industry has embarked upon a large scale expansion program.

The Edison Electric Institute of Chicago has estimated that orders have been placed by privately owned companies for approximately 12.2 million additional kw of generating capacity to be installed within the next 3 or 4 years. In addition, governmental power systems will be built so that the combined total capacity now planned for installation totals 16 million kw.

With the present demand for electricity at peak levels and the margin of reserve capacity low, some companies in certain localities are concerned regarding their ability to meet the demand of their customers at peak load periods. However, with the pooling of facilities by interconnections between systems and the utilization of capacity at its maximum, it is expected brief shortages can be alleviated.

In the meantime, the large expansion program of the industry is proceeding as rapidly as generating equipment is made available. Utility experts in Chicago point out that in sharp contrast to the rise in other living costs, the average residential consumer of electric service pays less today for a kw-hr than ever before. There has been a steady downward trend in the average price of residential electricity from 6.33¢ per kw-hr in 1929 to 3.22¢ in 1946. Whereas the cost of living is now up 57 pct over the base period of 1935 to 1939, the unit cost of electricity has actually declined about 12 pct in the same period.

Weekly Gallup Polls

(CONTINUED FROM PAGE 127)

hower, with Truman receiving four times as many votes as Wallace.

Those union members classifying themselves as Republicans named Dewey, Stassen and Eisenhower as their leading choices with Dewey far ahead in number of votes cast.

It will be seen that General Eisenhower has appeal as a candidate both to union members who consider themselves Republicans and to those who say they are Democrats. The same phenomenon has also been found in recent institute polls of the whole population.

As reported on several occasions the General, although not among the top four or five in popularity today as a possible candidate, consistently holds support from voters in both Democratic and Republican ranks. At the same time the country does not, by and large, know how to place the General politically. One fifth of voters polled recently said they think he is a Democrat and another one fifth said he was Republican. The rest confessed that they don't know what he is.

It was also found that General Eisenhower's popularity as a possible political leader was greater in the manual worker group than in any other major occupation group. Manual workers number in their ranks a considerable portion of labor union members.

AFA Appoints Committee

Chicago

• • • **Appointments to the** steel division research committee of American Foundrymen's Assn. have been announced by Chicago headquarters of the society.

The group, which will direct AFA-sponsored research in steel foundry technology, is headed by Clyde Wyman, metallurgist with Burnside Steel Foundry Co., Chicago, Charles F. Christopher, of Continental Foundry & Machine Co., East Chicago, Ind., is committee secretary. Also included on the committee are R. H. Frank, chief metallurgist for Bonney-Floyd Co., Columbus, Ohio, Gustaf A. Lilliequist, research director at the Indiana Harbor Works of American Steel Foundries, East Chicago, and Dr. C. H. Lorig, assistant director of Battelle Memorial Institute, Columbus, Ohio.

Fatigue Cracks

Kaiser Aluminum

• • Now that Henry Kaiser is wading into the aluminum business, his minions at Permanente Metals Corp. are learning that the glare of aluminum publicity has left some sections of the public temporarily blinded. Here are some excerpts of letters received during an advertising campaign, as quoted in the Permanente News:

" . . . why are you producing aluminum at such a critical time as this?"

" . . . I understand that you are the aluminum division of the Kaiser-Frazer Steel Corp."

" . . . please assure me that aluminum is not combustible."

" . . . my station wagon needs a new top. Please mold a top to fit and I will weld it on."

" . . . would aluminum ladders suit apple trees?"

" . . . please tell me how many people can get into a canoe before it sinks."

" . . . I have invented a gadget which, if made of aluminum, will revolutionize present civilization. For a substantial royalty, I would consider allowing your company to manufacture it. Please send me the advance royalty."

" . . . please send me some aluminum."

The only one we can give any help on relates to the canoe. We can predict authoritatively that it will tip over before any great number of people get into it. The question, therefore, should be considered as purely rhetorical.

Hell's Fire

• • We hadn't thought about it until E. T. White, John Deere Tractor Co., Waterloo, Iowa, called it to our attention, but it seems the recent heat wave had a depressive effect on the spiritual life of the nation. Reade White doped it out this way: People who have melted daily for several weeks on end in 104° of earthly heat lose their fear of the Devil and his furnace and tend to shy away from a rousing fire-and-brimstone sermon of a Sunday morning. We checked this postulate with one of our friends of the cloth, and found that, sure enough, church attendance has taken a greater than seasonal nose dive during these last few hot weeks. But Mr. White, who predigests THE IRON AGE for his fellow workers, hints that Old Nick, doing likewise, may have learned of the possibility of using oxygen as a booster. We're going to tell our Reverend friend to raise the question in his next sermon. Bet he'll be packing 'em in again Sunday after next.

Fixation

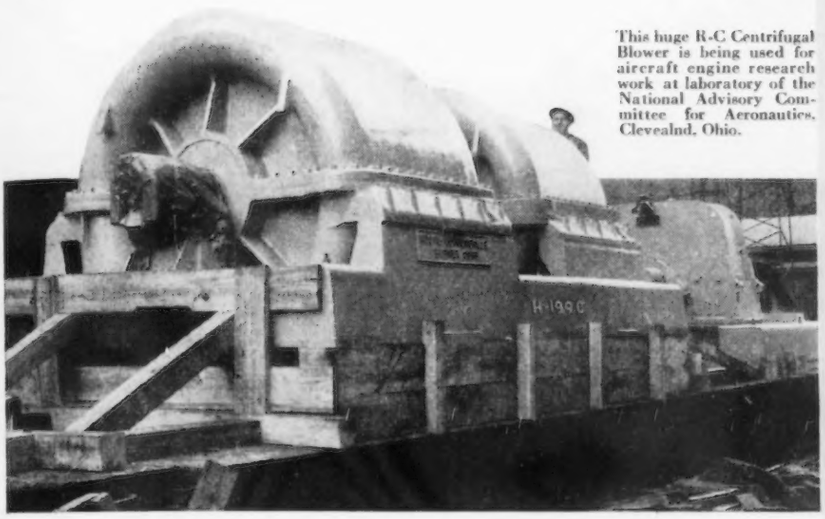
• • Most of the 500-odd inquiries answered each week by the reader service department aren't odd at all. The department was tickled to death to tell a reader up in Nova Scotia where he could get spare parts for his kitchen stove, to set a Czechoslavakian steel mill right on American slag practice, and to get a South American firm started right manufacturing floor polish. It had to blow the whistle on two English girls who wanted to start a correspondence with American opposite numbers. We're sorry to report, though, that the metal-working industry seems to have strangers in its midst. Any number of people are surprised to learn that there is a shortage of steel sheets—one man who had a big export deal lined up almost broke down in tears. But the one that pinked our hearstrings came from a steel salesman, now in a Midwestern state mental institution. He was tugging at the traces to get back in to his old line of work. Those fixations are awfully hard to cure sometimes.

Psychological Warfare

• • Either our loyal readers have been completely stupefied by a terror of illuminated flying saucers, or the above official U. S. Navy photograph found their imaginations in the tool room for resharpening. We asked for guesses as to what the shot represented, but no correct replies have come in. Before the secret agents of some foreign power muss up our files looking for the information we'll tell you what the Navy says:

"This wandering halo is the effect presented by a U. S. Navy helicopter on which has been installed experimental night-lighting consisting of lights affixed to the end of each rotor blade. The tip-lights are one of several devices being tested . . . to solve the problem of distinguishing helicopters from conventional aircraft at night."

Freight car loaded with WIND



This huge R-C Centrifugal Blower is being used for aircraft engine research work at laboratory of the National Advisory Committee for Aeronautics, Clevealnd, Ohio.

This freight car packs hurricanes! It's loaded with a Roots-Connersville Centrifugal Blower that in just one minute can push the air out of a 10′ circular tunnel, 450 feet long. Or, it can blow a gentle breeze, too, if that's what is wanted.

Not all industrial blowers are that big. But whether they're big or little, Roots-Connersville builds them down to the small Rotary Positive units delivering only ten cubic feet per minute. With both Rotary and Centrifugal equipment to choose from, our engineers can recommend the size and type that will precisely match your requirements. That's R-C *dual-ability*.

For any problem involving the profitable movement of air or gas, call on R-C *dual-ability*, based upon almost a century of specialized experience.

ROOTS-CONNERSVILLE BLOWER CORPORATION
709 Ohio Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE
ROTARY CENTRIFUGAL
BLOWER BUILDERS R-C SINCE 1854
BLOWERS · EXHAUSTERS · BOOSTERS · LIQUID AND VACUUM PUMPS · METERS · INERT GAS GENERATORS

* * ONE OF THE DRESSER INDUSTRIES * *

LET US PROVE THE VALUE OF *R-C dual-ability*

Your questions on the more profitable handling of air or gas will be welcomed by Roots-Connersville engineers. Check the following list for suggestions and we'll gladly supply information on your requirements.

- Pneumatic conveying systems
- Tunnel ventilation
- Acid-making processes
- Liquid aeration and agitation
- Grain conditioning or bleaching
- Departmental gas metering
- Heat-treating and annealing
- Vacuum filtration processes
- Boosting gas system pressure
- Priming centrifugal pumps
- Transporting live fish
- Supplying safety helmet air
- Mining and smelting
- Unloading tank cars and trucks
- Supercharging or scavenging Diesels
- Paper mill vacuum processes
- Drying textile yarns
- Reducing explosion hazards

MAIL THIS COUPON WITH YOUR LETTERHEAD

Roots-Connersville Blower Corporation
709 Ohio Avenue,
Connersville, Indiana
Please send information on:

BLOWERS_____ EXHAUSTERS_____
VACUUM PUMPS_____ METERS_____
BOOSTERS_____ INERT GAS GENERATORS_____
LIQUID PUMPS_____
NAME_____
TITLE_____

Dear Editor:

RICE HULLS

Sir:

. . . It is our understanding that in some one of the operations in the processing of steel, considerable quantities of rice hulls are used. Steel manufacturing is so entirely foreign to our business, that accordingly we are not familiar with this use of rice hulls. We represent the large rice mills, both in Texas and Louisiana territories, and our interest is one of seeking still another market and use for their products. . . .

J. H. KERN
Frank H. Snell & Co.
Houston

● Rice hulls and other waste grain products are used in the form of middlings in the tin mill and are used to wipe oil from cold-rolled sheet prior to tinning. Quantities involved could best be ascertained from various tin mills throughout the country. We are forwarding the names of a few of the larger mills.—Ed.

NON-MAGNETIC ALLOY

Sir:

In the Mar. 13 issue there was an alloy, Elgiloy, made by the Elgin Watch Co., which was supposed to be extremely rust resistant and resistant to ordinary chemical attacks, even by aqua regia. Could you give us any information about the composition of this alloy and whether it is available in the trades?

HAAKON STYRI
Director of Research
SKF Industries, Inc.
Philadelphia

● The nominal composition of this alloy is held to be 40 pct Co, 20 Cr, 15 Ni, 7 Mo, 2 Mn, 15 Fe, 0.15 C and 0.05 Be. Elgiloy is claimed to have the following physical properties: 368,000 psi ultimate tensile strength, 280,000 psi yield strength (0.02 pct); 233,000 psi proportional limit; 29.5 million psi modulus of elasticity; and 702 Vickers hardness number. Its non-rusting properties are said to be such that it is not affected by high humidity or fingerprints and that no rusting is noted after 500 hr in a salt spray test. For quantitative data available regarding the resistance to aqua regia, we suggest you write to the Elgin National Watch Co., Elgin, Ill., attention G. G. Ensign, director of research. Status of the availability of the material also can be ascertained from the company.—Ed.

GERMAN-ENGLISH DICTIONARY

Sir:

As a regular reader of your very interesting magazine I find that a number of terms have been created in various technical lines that can be found in no dictionary. Although I have available several very voluminous dictionaries, also special technical dictionaries, I very often come across terms I cannot trace anywhere. So I beg to approach you with the request whether you could let me know

Welded Steel Cuts Cost of Base 45%

By W. E. Benninghoff, General Manager
TOCCO Division
The Ohio Crankshaft Company, Cleveland, Ohio

BY thinking in terms of welded design for the fabrication of parts and assemblies of TOCCO Induction Heating Equipment, we have been able to benefit in two important ways.

1. Day after day, we use welded design in the development of work-handling fixtures and accessories for standard TOCCO machines and in the designing of special TOCCO machines. Each must be built to match a specific application. Welding permits us to use greater ingenuity and freedom in the design of this equipment and to manufacture quicker, at lower cost.

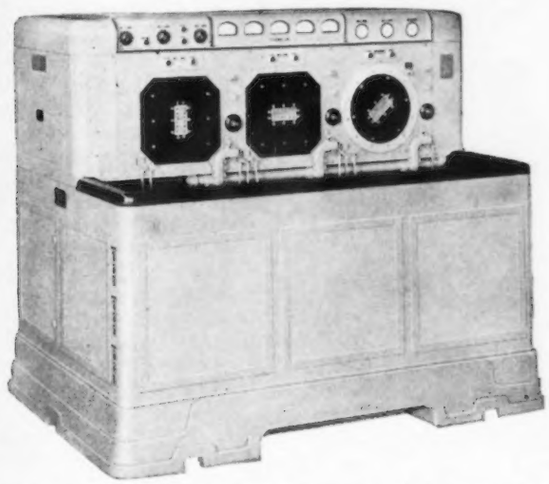


Fig. 1. Completed TOCCO Induction Heating Machine with former base.

2. In the manufacture of our standard TOCCO machines of all sizes and types, we use welded design for many parts to provide maximum rigidity and strength, lighter weight and lower cost. It also enables us to continually improve these parts because we are not restricted by patterns. The cabinet frame of the 150 KW TOCCO unit shown in Fig. 1 is an example of the larger welded steel parts which we have used for some time.

Recently we have also changed the base of the machine shown in Fig. 1 from cast iron to welded steel. The cast iron base weighed 3175 lbs. compared to 1180 lbs. for the welded steel base shown in Fig. 2. It was necessary to machine the top of the cast base to secure level mounting for the motor generator set. The welded base is sufficiently level as fabricated and requires no machining, thus providing further saving.

Fig. 2. The new welded steel base for 150 KW machine shown in Fig. 1.

The total net cost saving with the welded steel base is 45%.

The base of this TOCCO machine supports a 150 KW high-frequency motor-generator, transformers, electrical controls and other equipment, housed in a steel cabinet. The total weight of the machine, including the base, is about 12,000 lbs. In service, it must be permanently level, rigid and have good vibration-dampening qualities.

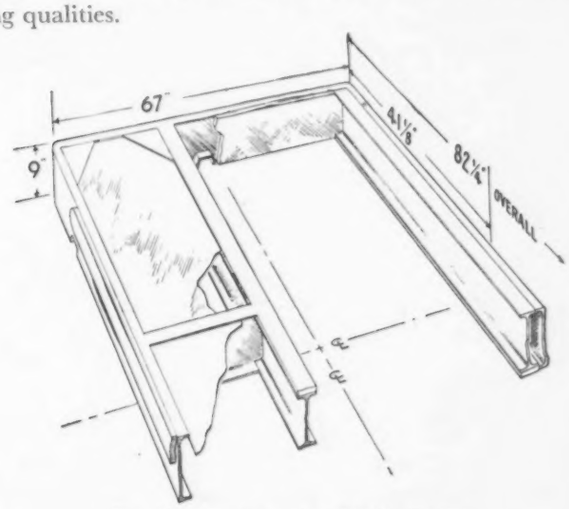


Fig. 3. Schematic drawing of fabricated base.

The construction of the welded steel base is shown in Fig. 3. Made of standard mill shapes and plate, it requires a minimum amount of welding, resulting in close control of tolerances and minimum cost. It is proving highly satisfactory in performance in every respect.

any literature on modern American technical terms (especially in the steel and machinery line) translated into German language which is spoken in Austria. I would then communicate with the publishers and try to obtain a copy of the latest edition.

VIKTOR KLEINLERCHER
Vienna

● Besides the usual German-English dictionary, the only other volume which might be of interest is a book that can be secured from the George Stechert Publishing Co., 31 East 10th St., New York, entitled "Malborough German Technical Words and Phrases." However, we understand this was issued in 1931 and it would hardly seem up-to-date enough in view of the new techniques and terms developed during the war. —Ed.

NAIL LABELS

Sir:

The first cut-nails were made in England many years ago and the name given to various size nails was established by how many nails could be made and sold for one penny. Small nails, that took more time and work to make, were sold four for one penny and the larger ones 10 for one penny, because the latter ones took less time and labor to produce 100 lb. Thus the name "penny-nails" was established and the name prevails today. The name, however, had nothing whatsoever to do with a universal understanding of any common nail's length—unless one just happened to know it. Therefore, it is about time common wire-nail manufacturers abandon the "penny" system and begin to label common wire nails in accordance with their length, so that users can easily buy suitable wire nails for all kinds of work.

A. W. HEINLE
Consulting Engineer
11 Maplewood Ave.
Pittsburgh

HEAT-TREATING DEPARTMENT

Sir:

It is requested that reprints of "Planning a Toolroom Heat-Treating Department" by R. C. Onan, as published in the July 31 and Aug. 7 issues be forwarded to this shipyard...

T. G. REAMY
Captain, U. S. N.
Production Officer
Portsmouth Naval Shipyard
Portsmouth

IMPORTANT DEVELOPMENT

Sir:

We have just been shown a copy of the Aug. 14 issue with a most interesting and greatly appreciated reference to the Cookson lock joint. The Cookson locking system, which is covered by a group of patent applications in some 25 countries, is creating a tremendous interest throughout the sheet metal working industries and has already been or is about to be adopted for such applications as refrigerating

P&H RECTIFIER CRANE BRAKES

...Another P&H Added Value— Reduces Solenoid Maintenance

● They bring to AC installations the advantages of DC magnetic brakes: quick action; accurate "inching" of loads; greater durability; trouble-free performance.

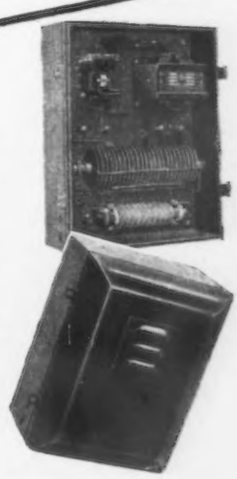
● Eliminate the destructive hammer blows that cause mushrooming of laminated AC magnets.

● Avoid the vibration and frequent coil burnouts of AC magnets, due to excessive air gaps.

P&H's CD Brake and Rectifier Assembly converts AC to DC for better braking action.

P&H Rectifier brakes eliminate both the laminated structure of the AC magnet, and the long stroke which destroys it. An important item of maintenance is thereby pared down to new minimums.

These brakes, like all the other electrical equipment used on P&H Overhead Cranes, are P&H-made specifically for crane service. Fitted-to-the-job electrical equipment and many mechanical features are Added Values that only P&H—America's largest crane builder — can offer you.



RECTIFIER UNIT. The dry type, full wave selenium rectifier unit used in P&H Rectifier Brakes converts AC current to DC without the use of moving parts. It is also liberally rated — thus requires no maintenance whatsoever. Can be mounted adjacent to brake or in a remote location. Available for 110 to 550 volt and 25 to 60 cycle operations. Write for Bulletin C-25.

P&H

ELECTRIC OVERHEAD CRANES

4401 W. National Ave.
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

ELECTRIC CRANES • EXCAVATORS • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

cabinets and kitchen cabinets, roofing, partition walls, truck panels, ventilating ducting, flat-jack returnable packing cases and a good many others. There is no doubt that this new lock joint is an invention of great fundamental importance and, in fact, a leading figure in the industry yesterday at the Engineering Exhibition at Olympia. It was described as "the greatest thing that has happened in sheet metal since welding." That may or may not be so, but there can be no question of it being a development of really outstanding importance . . .

J. C. V-INGLESBY
Cookson Sheet Metal Developments, Ltd.
London

PLASTIC ADHESIVE

Sir:

The Aug. 28 issue carried, on p. 66, an item entitled "Plastic Film Locks Threaded Parts," about a new product known as Plasticol. We are interested in obtaining further information about this product and would appreciate very much your sending us the address of the P. Pieper & Co. who apparently manufacture it.

W. C. STEWART
Technical Adviser

● The address of P. Pieper & Co. is 25, Cote d'Eich, Postbox 75, Luxembourg (Grand Duchy).—Ed.

SHOOTING HOLES IN RAILS

Sir:

Newsfront of the Aug. 28 issue has an item regarding the firing of cartridges to produce a clean round hole in drilling holes in rails. Could this be adapted in the general structural shop and where can we get fuller information regarding it?

J. A. SISTO
Barium Steel Corp.
New York

● The equipment is called a velocity powerrail punch and is made by the Mine Safety Appliances Co., Braddock, Thomas & Meade St., Pittsburgh.—Ed.

STEEL SPECIFICATIONS

Sir:

I am interested in obtaining the source of the following information: The chemical and physical properties of the various grades of steel such as 10-10, 10-15, 10-17, etc. I possess a book called "Cross-Index of Chemically Equivalent Specifications and Identification Code," prepared at the request of the U. S. Armed Services, which lists the various code numbers of steel and various chemical properties. In addition, I desire a similar table showing physical properties and the heat treat for same. If you can advise me the source of the above information, it will be appreciated.

J. A. GOOD
Engineering Dept.
Diamond Power Specialty Corp.
Detroit

● The SAE Handbook gives information

NOW! the New Shafer Standard Duty Pillow Blocks

with the **DOUBLE EXTENDED INNER RACE**

and the **Z HOUSING SEAL**

and the **PRE-ADJUSTED DOUBLE ROW BEARING ASSEMBLY**

and the **NEW STRUCTURAL STURDINESS**

In its program of constant bearing progress, Shafer has redesigned its line of Standard Duty Pillow Blocks for far more efficient bearing performance.

Now the inner race extends on *both* sides of the bearing . . . increasing the length 40 to 90% . . . correspondingly decreasing the per unit area shaft pressure, wear and any tendency to mechanical fretting. The collar locking set screws firmly force the shaft against the race on the side opposite the set screws, reducing any tendency to pound or whip. The set screws hold under constant tension and don't work loose under severe operation.

Despite the increased race length, the total length is less and this more compact design allows gears, pulleys, etc. to be mounted closer to the bearing and reduces shaft stresses.

The housing has more rugged buttressed construction. The pillow block is available in 2 bolt and 4 bolt models and is interchangeable with previous designs.

Another feature is the new and already famous Shafer Z Radial Float Roller Bearing Housing Seal which more efficiently than any other seal keeps dirt out and grease in.

The Standard Duty Pillow Block also embodies the famous Shafer self-aligning radial-thrust, pre-adjusted double row roller bearing.

There is no other Standard Duty Pillow Block that offers these features and this degree of performance. Try this new Shafer Pillow Block and see for yourself. SHAFER BEARING CORPORATION, General Offices: Chicago 7, Illinois.

SHAFER CONCAVEX SELF-ALIGNING BEARINGS

WRITE FOR FREE DESCRIPTIVE BULLETIN ZXX1

on physical properties and heat treatment for the SAE steels. Much of the material is presented in chart form. The volume can be secured through the Society of Automotive Engineers, Inc., 29 W. 39th St., New York.—Ed.

NOT BONDERIZING

● In the article "Degreasing and Rust Inhibiting with Infra-red," May 15, 1947, p. 51, it was stated that a Burdett burn-off and rust proofing oven had replaced a Bonderizing installation. It has been pointed out by the Parker Rust Proof Co. that a Bonderizing installation was not replaced in this installation. The process replaced was a rust inhibiting process, but not a Bonderizing installation. The word Bonderizing was used improperly as a generic term in the original information supplied THE IRON AGE, whereas Bonderizing is a registered trade mark of the Parker Rust Proof Co.—Ed.

ROLLING FENDERS

Sir:

We are interested in purchasing a machine to roll fenders for use in our factory here. We are wondering if you can tell us who manufactures one suitable for our purpose. We wish to make these fenders out of 14 gage material. We need these fenders from 18 to 26 in. radius. We are of the opinion that they are rolled about 13 in. wide with a 2-in. lip on each side, then cut down the middle giving two fenders.

H. G. HATTER
General Manager
Maryland Mfg. Co.
Laurel, Md.

● Names of manufacturers of equipment capable of rolling the fender sections that you describe are being forwarded. You might consider stamping since material as heavy as 14 gage may not take to roll forming as well as to stamping, especially with the radius in the finished part.—Ed.

POWDER METALLURGY

Sir:

Would it be possible for me to secure tear sheets of two articles in the May 22 issue, "Powder Metallurgy —Process or Product?" by Earl S. Patch and "New Developments in Powder Metallurgy" by G. J. Comstock and J. D. Shaw.

W. J. BAEZA
Industrial Research Co.
New York

ELECTROSTATIC DETEARING

Sir:

I believe your magazine has carried feature articles on electrostatic detearing equipment. Unfortunately, I cannot now trace this information. Can you supply me with the name and address of the manufacturer?

R. STEWART
Metallurgist
Pratt & Whitney of Canada
Dundas

● The manufacturer is Harper J. Ransburg Co., Electric Coating Div., Barth & Sanders Sts., Indianapolis 7.—Ed.